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T WEEK . . .

ating, Corrosion Protection Developments Revealed

hat To Do About Temper Brittleness of Steel

roduction of Iron Ore—I

Heatless Process May Change Welding Practice

STEEL

The Magazine of Metalworking and Metalproducing

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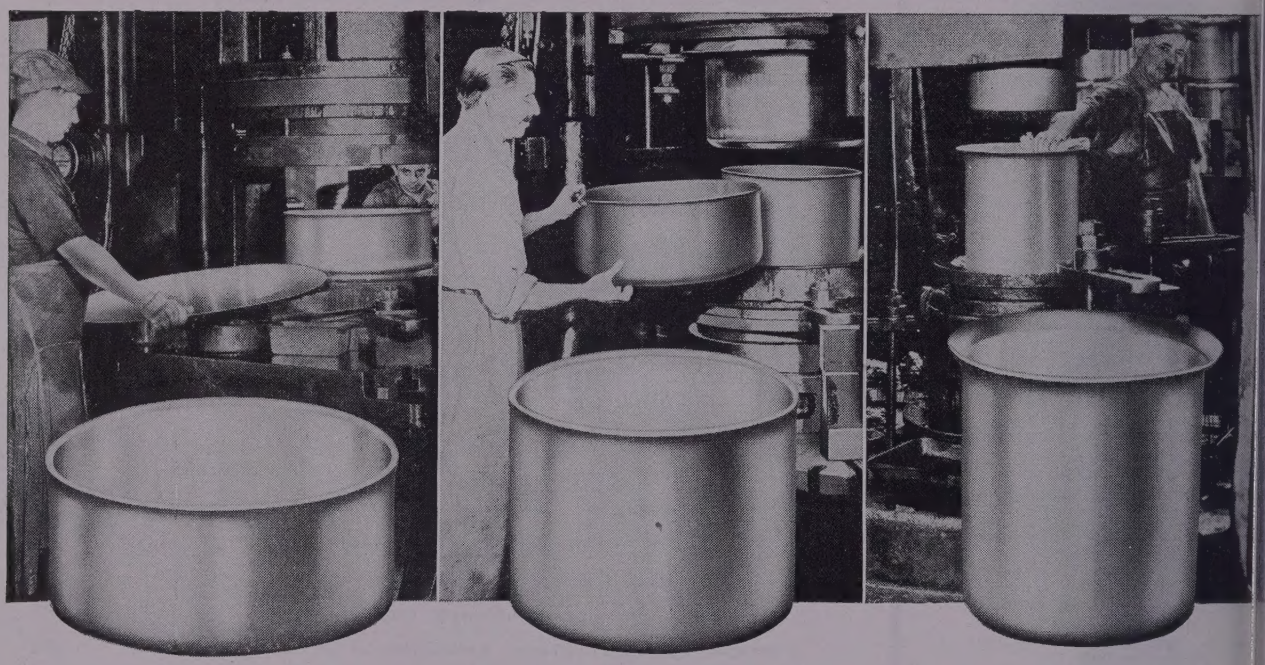

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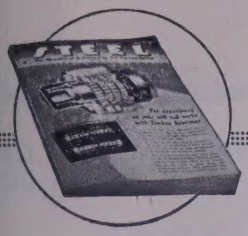

November 14, 1949

Economic Frustration

On page 65 of this issue appears an illustration showing two Oldsmobile passenger cars. One is a "Limited" four-door touring car built in 1910. It weighs 5000 pounds and was priced at $5000. The other is a "Futuramic 88" convertible coupe built in 1949. It weighs 3845 pounds and sells for $2586.

The contrast in the two cars reflects technological progress, improvements in organization and many other advances during the 39-year interval. The remarkable increase in value per dollar of purchase price is all the more noteworthy because during this period hourly wages in the automobile industry increased eight times.

Everybody will agree that improvements in technique which permit the buyer to get more for his money at the same time the worker gets eight times as much in money for his hour of work are highly desirable. Unfortunately, there is another factor in this equation.

That factor is the buying power of the dollar. On Oct. 23, Representative John Taber of New York made some pertinent remarks about inflation. "If a man who earned $1500 annually before the war now earns $3000," declared Mr. Taber, "he is at least 10 per cent worse off on account of price increases and an additional 10 per cent worse off on account of tax increases. Thus as a result of Mr. Truman's planned inflation, the low income family is 20 per cent worse off than it was before."

If Representative Taber had gone back to 1910 instead of to 1941 for a figure with which to compare today's buying power of the dollar, the contrast would have been even more startling. It seems clear that for a number of decades much of the gain we have made in manufacturing more efficiently has been more than offset by serious declines in the purchasing power of our money.

In spite of this and in spite of a federal deficit next June 30 which will amount to from $5.5 to $8 or even $10 billion, President Truman seems determined to seek even more inflation. It is a shame that industry's effort at higher wages to produce more and better goods at lower prices for more people constantly is being frustrated by fiscal chicanery.

* * *

WHO ARE THE WINNERS?: Direct losses resulting from the steel strike are heavy. It is estimated that steel company employees lost $178 million in direct wages. They will have to work two full years to regain in future social security benefits the wages they lost during the past six weeks.

The loss in steel ingot output from the beginning of the strike until operations return to the prestrike rate will amount to 10.5 million net tons. This has a dollar value of more than $700 million. The increased burden per hour, in the case of some companies, will amount to as much as $4 per ton of steel. What portion, if any, of this will be passed on to the buyer in the form of higher prices cannot be predicted now.

As steelworkers, operators, steel customers and the general public contemplate these losses, they are bound to wonder whether anybody in the long run will have won enough to compensate for the losses. It may take all of three years to find the final answer.

Unquestionably public resentment over steel and other strikes in 1946 was a factor in the election of November of that year which gave

(OVER)

the Republicans majorities in both houses of Congress. If the tactics by which Mr. Murray and the present administration engineered the recent work stoppage, with its resultant losses, coupled with the coal mess, provoke a similar resentment, it could be possible that by November, 1952, the real losers will turn out to be those who appear to be the winners today.

—p. 51

* * *

ASSOCIATIONS DOUBLED: Since the beginning of World War II the number of industrial associations has increased by leaps and bounds. In the metalworking and allied fields alone the number has mounted from 340 in 1941 to 790 in 1949. It is estimated that in the next 30 days about 240,000 persons will attend 60 metalworking conventions and exhibitions. The average person who attends will stay in the convention city 3.9 days and will spend about $1 an hour during his visit. Most major conventions and shows are held in Philadelphia, Atlantic City, New York, Cleveland, Chicago and St. Louis.

Probably the marked increase in associations and conventions results largely from the trend toward greater specialization. Small groups break away from larger associations and form their own organization so that they can specialize on problems of common interest. —p. 62

* * *

HOW TO USE STAINLESS: In the current installment on "The Production of Stainless Steel," the author, B. H. DeLong of Carpenter Steel Co., describes various types of stainless steel with valuable information as to their physical properties, fabricating problems and indicated applications.

In reading Mr. DeLong's discussion, users of stainless steel will be impressed not only by the number of types available for a wide range of uses but also by the ingenious manner in which many steels may be handled to circumvent difficult forming, machining, finishing and similar operations. For instance, because of their excellent toughness, the 18-8 types of stainless steel are more difficult to machine than many steels. Type 303 was developed to answer this problem. Machinability was improved by additions of selenium or sulphur.

In numerous similar instances, slight changes in analysis or in treatment affords the user a steel and a handling technique which can be adapted to almost any conceivable requirement. Mr. DeLong's article is full of good hints for users of stainless steel. —p. 102

* * *

ATTRACTIVE INVESTMENT: In addressing the Boston chapter of the American Society of Tool Engineers, Tell Berna, general manager of the National Machine Tool Builders' Association, declared that the loss of production due to the steel and coal strikes is far less than the nation's loss of potential production due to the obsolescence of machine tool equipment.

Mr. Berna based this arresting statement on the estimate that 43 per cent of machine tools now in use are ten years old or older and 95 per cent are over ten years old in design. "American industry is still operating largely with machine tools of war vintage, the models of which were frozen in 1940," he explained. "These machines," he added, "average one-third less in productivity than the new models displayed at the Machine Tool Show in Chicago two years ago."

At this average figure, purchase of a new machine would provide a 50 per cent increase in productivity, which should be an attractive investment. —p. 57

* * *

33 WAYS TO CUT COSTS: A survey of 25 companies by the Controllership Foundation, research organization of Controllers Institute of America, reveals 33 major ways in which industry can reduce costs. These 33 fall into four categories: Inventory reduction and subsequent control, reduction of production costs, cutting administrative overhead and expanding sales.

While opportunities in each of the four categories differ according to type of product, many metalworking companies probably will find that reduction of production costs is most important. According to the controllers' survey, the most popular ways of reducing production costs are controlling scrap losses, controlling budgets, introducing incentive plans, improving inspection procedures, simplifying product, standardizing, mechanizing and improving materials handling.

In numerous plants this would be a good check list for management to use in its constant effort to cut costs. —p. 63

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

SMOG AGAIN—Smoke is pouring from mill stacks in the steelmaking centers again as many of the larger mills resume production after six weeks of strike idleness (p. 51). Operations will rise fairly sharply this week, although necessary repairs to facilities damaged during the strike will preclude reaching the prestrike rate. Loss in ingot production is estimated at 10.5 million tons, which converted into finished products would have brought more than $700 million. Direct wage losses to strikers are estimated at $178 million. Indirect losses are incalculable.

BUSINESS OUTLOOK—Look for a wobble in the nation's postwar economic cycle as a result of the steel and coal strikes (p. 53). Had there been no major strikes we may have been well into an industry expansion phase of a three-stage progression: Initial boom, shakeout, expansion. The shakeout period in which we now find ourselves will be prolonged because the steel industry will take about nine months to make up lost production. Prospects for major steel-consuming industries—auto, construction and appliance—are bright. Public construction, particularly, should be good. In last week's elections, voters approved $1.5 billion in bond issues for public building. This compares with $1.2 billion approved in 1948 and $1.1 billion in 1947.

AUTOS—Automakers think a lot of you are going to buy a new car in 1950 (p. 65). They estimate that next year's production will fall only 10 or 15 per cent below the record 6.4 million units likely to be assembled this year. A preview of new models reveals only minor changes in the 1950 appearance, but considerable refinement in engine and transmission design.

FTC STEEL CASE—Lynn C. Paulson, Federal Trade Commission trial attorney, says an out-of-court settlement of the steel pricing case is no capitulation by the FTC and not at variance with the commission's aims (p. 56). The agreement, which would permit freight absorption that does not unlawfully lessen competition, is in line with the O'Mahoney measure pending in Congress. No date has yet been set for presentation of the proposed settlement for FTC approval.

FEDERAL SPENDING—Now that your congressman is home, the time is ripe to let him know how you feel about federal spending (p. 58). In the next session, Congress will know what it's doing about appropriations. A new method provides that one consolidated general appropriation measure cover everything except deficiencies and supplementals. No longer will the multiplicity of appropriations measures, as permitted by the old method, give the lawmakers an out. They can't say they didn't realize how expenditures were mounting. The fiscal picture for the year ending next June 30 is the most dismal in peacetime history. The deficit this year will be from $8 billion to $10 billion.

FOREIGN—We in the United States have set a new deadline for Western Europe (p. 61). In effect, Europe has been told: Unite economically or don't expect new ECA help next year. Administrator Paul G. Hoffman and Secretary of State Dean Acheson are urging economic union now, political union eventually. The proposals are meeting cool receptions overseas.

CONVENTIONS—You and some 240,000 other people may be attending one or more of about 60 metalworking meetings and shows in the next month. (p. 62). Nearly 2.9 million persons this year have attended or will attend about 720 metalworking gatherings. In 1950 even more conventions are scheduled, but total attendance will slip.

HERE AND THERE IN INDUSTRY—Around 43 per cent of the machine tools now in use are at least ten years old, and 95 per cent are over ten years old in design (p. 57) . . . Ingot output in October was the lowest in 17 years (p. 55) . . . In August automakers increased their lead as the principal steel consumer; construction was second (p. 55) . . .Both exports and imports of iron and steel gained in August (p. 56) . . . Tool and die manufacturers' outlook is good (p. 63).

ngineering News, p. 79 Market Summary, p. 135

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STEEL
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eel Output Gaining Momentum

Recovery to prestrike operations slowed by necessity for repairing furnaces. Miners' return assures adequate near-term fuel supplies. Wage, production losses huge

ES over Pittsburgh, Chicago, gstown and other steelmaking rs are darkening again as blast aces and open hearths resume uction. But people tempted last ner to complain about the smog glad to see it again.

elworkers and operators are ing their losses. The score is thing like this:

o Years To Regain—Strikers an estimated $178 million in di- wages. If pension and social in- ice gains amount to 10 cents an they will work the next two to regain in future social se- y benefits the losses in wages of ast six weeks. For many steel- ers, savings have vanished. Some beginning to feel hunger pangs the strike ended.

el Loss High—Loss in steel in- roduction from the start of the until prestrike operations are ned will amount to 10.5 million This is equivalent to 7.8 million of sheets, plates, pipe and other ed steel products. The dollar e of the lost production of steel will amount to more than $700 n.

vis Gives In—Lending hope that capacity operations will be re- d within the next week or two moratorium in the soft coal .

ed with some back-to-work ments among his near-destitute s and with the probability that government soon would crack on the coal strike, John L. gave his miners the nod to re- o work without a contract until 30.

el mills have coal stocks vary- om a low of two or three weeks' y in the Mahoning valley to five weeks' or more at other cen- Coal mines will be operated on or six-day week as long as al strike moratorium lasts.

e Furnaces Damaged—Mainte- workers are repairing damages eelmaking facilities resulting the strike. One producer re- eight of 16 open hearths re- relining. A Pittsburgh open- superintendent hates to hear lephone ring; too often it is from the mill reporting another furnace roof has caved in.

Other mills say facilities have been maintained in good shape throughout the work stoppage and that a high level of operations can be reached within a few days.

Finished products will be flowing from many mills this week and near-normal operations can be expected within 10 days. Metalworking companies whose inventories have been depleted or unbalanced by the strike may require several weeks to restore them to a good operating level.

The Pension Pattern

Pension agreements signed by the larger steel producers and the United Steelworkers generally follow the Bethlehem pattern, although some important differences are indicated.

Benefits of $100 a month, including federal social security, for employees with 25 years of service are provided at retirement at age 65.

The company pays the entire pension cost.

Minimum Pensions Guaranteed — Employees with 15 years of service are guaranteed $60 a month and 20-year employees will get a minimum of $80 monthly at retirement at age 65. If an employee's earnings and years of service entitle him to more than $100 a month, he will get what he is entitled to under the formula. This formula provides he will receive 1 per cent of his average monthly earnings for the last 120 months of employment multiplied by his years of service. Thus a worker averaging $300 a month during his last 10 years of employment and having 40 years of service would be entitled to $120 a month plus his social security.

Inland Offers Alternatives—Inland Steel Co. offered to give its workers a choice of two pension plans: 1. A noncontributory pension of $100 a month, generally following the union pattern; 2. continuing in Inland's established retirement income plan which the company says guarantees the steelworkers substantially more than the industry pattern. Under the latter plan, the worker would contribute.

Lukens Plan Amended—The noncontributory plan in force at Lukens Steel Co. for more than 30 years was accepted by the union with slight modifications. Single men will receive the same pension as married men under the modified plan. Heretofore, married men have received more. A $10 a month increase is provided for pensioners with 40 years of service.

Newport Settles for Dime — Newport Steel Corp. agreed to contribute 10 cents an hour toward pensions and social insurance, including its present

STEELWORKERS PUT TORCH TO TAP HOLE
. . . as mills resume production after 6-week strike

contribution toward a welfare program. Employees will continue to contribute toward the social insurance plan. Details of the pension plan and possible changes in the insurance plan will be worked out later.

Disability—Several settlements provide that employees incapacitated after 15 years of service will receive a disability grant of $50 a month from the time he is disabled until he reaches 65. At 65, he will become entitled to the pension called for by his service prior to disability.

Contributory Insurance

Social insurance program provided in the strike settlements will be on a contributory basis. Amount of employees' contributions vary.

The Bethlehem agreement calls for equal sharing by worker and company of the cost of insurance, estimated at a total of 5 cents an hour.

Republic employees will pay an average of 3½ cents an hour for insurance and the company will pay 2½ cents.

Inland offers to pay 60 per cent of the cost of insurance, with the worker paying 40 per cent.

Jones & Laughlin and employees will share equally in cost of insurance program to cost not more than 5 cents an hour.

Lukens will pay 62½ per cent of insurance costs, against 37½ per cent by employees.

Insurance benefits will vary under the agreements, but generally include group life, sickness and accident benefits, hospitalization and surgical expense reimbursement. Details remain to be worked out in many plans.

Pension Talks Spread

Granting of noncontributory pensions by the larger steelmakers is spurring unions in other metalworking industries to press for similar benefits. Talks are being held or are being asked by the union in the automotive, farm equipment, electrical and many other metal fabricating industries.

International Harvester is conducting pension-insurance bargaining talks with the United Auto Workers-CIO. Talks also have been held with the United Farm Equipment Workers, left-wing union which was ousted by the CIO two weeks ago.

Exploratory conversations are underway between the UAW-CIO and General Motors whose contract runs until May 31.

Chrysler Corp. is bargaining with UAW. Ford granted noncontributory pension of $100, including social security benefits, several weeks ago.

COAL FLOWS FROM PITS AS LEWIS GIVES IN
. . . but plenty of cars remain to be filled

Negotiations between electrical equipment companies and the left-wing electrical workers union just expelled from the CIO will be hampered by the uncertainty regarding affiliation of workers in these plants. Large numbers of workers are indicating their desire to pull out of the left-wing union and remain in the CIO's new right-wing electrical workers union.

Coal Shipments Resumed

John L. Lewis lost the coal strike. His miners were hungry and destitute. Many had no coal to heat their own homes. Some went to work in nonunion mines. Others were starting a back-to-work movement that threatened to spread.

The United Mine Workers might have disintegrated had not Mr. Lewis declared a moratorium in the coal walkout.

U. S. Ready To Move—The government was getting ready to crack down on the coal strike. The administration would rather crack down on Mr. Lewis than almost any other labor leader. President Truman reportedly was ready to invoke the Taft-Hartley act if last-minute mediation efforts failed.

This would have meant a fact-finding board probing into the affairs of the miners' union. The miners' welfare fund would have come under scrutiny. Questions as to why the fund is near-bankrupt would have been raised. Charges by the operators that the fund has been mismanaged would have been explored and the secrecy surrounding the fund's administration would have been brus aside. Mr. Lewis deemed it wise send his miners back to work.

Full Week—Coal shipments are turning to normal. During the m torium the mines will be oper either five or six days a week the discretion of the operators. Mi will be paid overtime rates if sixth day is worked.

Railroads Recall Men—Furlou railroad employees were called to work as the mines reopened. M than 90,000 railroad employees expected to return to their jobs week.

Trucking companies in the mining districts, which were al paralyzed by the coal stoppage, active again.

Bridges Wants Out

Sen. Styles Bridges (Rep., N. wants to be discharged as net trustee of the miners welfare f The senator has asked the dis federal court in Washington to charge him after an accountin made of his stewardship of the fare fund.

His action followed numerous cisms of the management of the by mine operators and by m with claims against the fund.

The fund ran out of money after Mr. Lewis ordered a work-week in the mines. Actu contend that the welfare fund never on a sound basis and w have run into trouble even if miners' work-week had not bee breviated.

conomic Cycle Wobbles

Strikes postpone transition to third, expansion phase of postwar economy until late 1950

CTORS missed their cues for the rd act of America's postwar economic drama, but they should be let perfect for the next try, probably come late in 1950.

In August and September economic alysts were saying that possibly rly next year the transition from shakeout phase in our economy to e of industry expansion could be ll along (see STEEL, Sept. 12, p.), provided no major strikes occrred. The coal and steel walkouts ve disrupted the timing in the tradional U. S. postwar cycle: Immeate boom, shakeout and industry pansion.

Shakeout Prolonged—The shakeout ge in our economy will be proged as industry tries to overcome e loss of 10.5 million ingot tons of el, millions of tons of coal and lost ges, savings and company earngs.

The steel industry should take nine nths to make up the strike losses, suming that it would have been erating at about 85 per cent of pacity had there been no strike and t it soon begins to go at nearpacity operations.

Prices May Rise—Stable or slightl declining prices—a "must" for the rd expansion phase which was apently being met in August and ptember—now appear unlikely for e next nine months. Steel produce certainly won't be able to cut ces, may have to boost some to er higher costs. A hint of things come is seen in the activity of nferrous metals. Zinc and copper ve risen since the beginning of steel strike. Lead and tin have lined, but they might have risen l it not been for currency devaluons in September. Only aluminum the major nonferrous metals rens stable. The composite price f steelmaking scrap has risen to $3 from the October average of $3.71. When there was no strike September, the composite stood at $3.07.

osperity Cycle Possible

The basic ingredients—money and nand—are present to start the ntry off on a new cycle of prosity, says Cloud Wampler, presit of Carrier Corp., Syracuse, N. Y. He told the Society for Advancent of Management in New York t he expects a "temporary spurt" the first half of 1950, followed by a decline in the second six months when we begin to pay for the coal and steel strikes.

Sufficient money and strong demand are not enough, says Mr. Wampler. These factors "are unalterably mixed up with the political ingredients" which are "leading us toward a welfare state." He urged businessmen to give more of their time to practical politics.

Appliance Slowdown Seen

The major appliance industry, which was working extra shifts for two months before the steel strike, is still operating at high levels but dwindling steel supplies may bring mass shutdowns in the last half of November, even if all the steel industry is back to work by then. Appliance makers expect a three-week lag before they get steel deliveries again.

General Electric Co. last week closed its Erie, Pa., refrigerator plant which employs 6000. Westinghouse Electric Corp. is still producing refrigerators on a 16-hour-a-day basis, but the steel strike has delayed production of 1950 models. Another item to be affected, after refrigerators, will be the tank-type-vacuum cleaner.

Kelvinator Sales Set Mark

Refrigerator sales of the Kelvinator Division of Nash-Kelvinator Corp. reached a new high in the fiscal year ended Sept. 30. Eight per cent more refrigerators were sold than in the 1948 fiscal period, the best previous year.

Encouraged by Rise in Sales

Rise of third quarter sales to a level 32 per cent above those of the second quarter helps Apex Electrical Mfg. Co., Cleveland, feel encouraged over the outlook for the home appliance business.

The company's third-quarter sales totaled $5,372,536, compared with $4,077,207 in the second quarter. Heartening to the company is a heavy backlog of orders on most of its products.

Vanadium Finds Uranium

Vanadium Corp. of America has discovered a new uranium bearing orebody in Utah near Marysville about 220 miles south of Salt Lake City, President W. C. Keeley confirms.

"It is a new type of uranium deposit," says Mr. Keeley, "and it looks very promising." He says the deposit contains good grade ore, but he would not disclose its type or the uranium content.

One Strike Helps, One Hinders

Oil heater industry hopes the steel strike won't prevent it from meeting the increased demand engendered by the coal strike. A 20 per cent increase in 1950 sales is expected.

A. T. Atwill, president of the Oil Heat Institute of America, says that makers of central oil heating units already have exceeded their 1949 goal of 550,000 units sold. Two years ago they sold 850,000, partly because of strike effects on coal supplies. In 1948 the total dropped to 450,000 largely because of reports of oil shortages.

Voters Make Business

Construction projects given approval at elections will create demand for metal products

IN LOOKING for business, don't overlook public construction projects!

Not only are they at a high level but the voters in last week's elections authorized a lot more. Across the country more than $1.5 billion of additional state and local government spending now bears approval. That figure, described as record-breaking, eclipses the $1.2 billion worth of bonds approved at the polls in November, 1948, and $1.1 billion in November, 1947.

All of the money involved in the $1.5 billion worth of bond issues approved last week will not go to construction projects: Some of it is for veterans' bonuses.

Bulk for Construction—Nevertheless the bulk is for construction projects which will require products of the steel and metalworking industries.

Voting approval on $1.5 billion worth of bond issues does not mean the voters are getting reckless. They are merely doing two things: 1. Replacing obsolete facilities that could not be replaced during the war and in the materials and labor shortage period immediately after the war; 2. expanding facilities to accommodate the increased population. Passage of all of the issues was not a snap for proponents. In some instances the voters' approval was won only after vigorous promotional campaigns and several attempts to pass an issue.

Highways Lead—The uptrend this year over 1948 and 1947 in public construction shows contracts awarded by state and local governments for such work in the first eight months of 1949 to be $2,825,129,000, compared with $2,305,066,000 in the correspond-

ing period of last year. So reports the U. S. government's General Services Administration. Leading the construction classifications is highways, with contract award valuations totaling $970,691,000 in the first eight months of 1949. Second are educational buildings, $570,040,000. Hospital and institutional building accounts for $258,493,000; sewerage systems, $201,878,000; and water supply facilities, $165,646,000.

U. S. Calls for More Roads

The Federal Bureau of Public Roads is calling for an $11 billion expansion and improvement program to prevent the nation's highways from "going to pot."

The program would take 10 to 20 years to complete, would improve 40,000 miles of interstate systems, would build 11,000 miles of divided four-lane highways.

Today there are 43 million cars and trucks on the roads, compared with only 26 million vehicles in 1930. The bureau estimates that the American highway system would be adequate only by 1933 standards. Although the agency spent an alltime record of $1.7 billion this year for road construction, it considers itself 17 years behind the times.

Electrification Needs Large

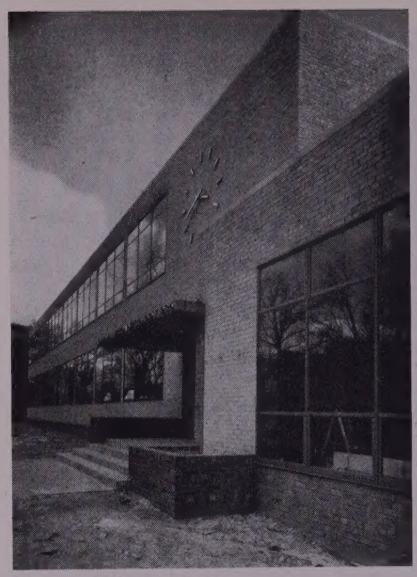
Rural Electrification Administration's latest survey shows 1,277,153 farms are still without central station electric service. There are also hundreds of thousands of unelectrified rural non-farm dwellings, crossroads businesses, schools, churches etc. which are not included in the survey.

Congress has authorized $350 million in loan funds for fiscal 1950 for rural electrification. On the basis of the REA survey $175 million will be apportioned among the states. Biggest recipients will be: Mississippi, $18.4 million; Missouri, $12.9 million; Kentucky, $11.6 million; Texas, $11.4 million; and Tennessee, $11 million. The remaining $175 million plus $45 million in carryover funds from fiscal 1949 are available without state allotment, but no more than 10 per cent of these funds can be loaned to any one state.

Communities Rush for Housing

Communities all over the country are rushing to benefit from the low-rent public housing program established by the Housing Act of 1949.

Act authorizes construction of 810,000 housing units to be built in the next six years with federal financial assistance; it sets a limit of 135,000 for any one year. So far 48 communities have received Public Housing



MORE NEW SCHOOLS
. . . voted by taxpayers

Administration approval of loan applications covering 191,280 housing units to be constructed over the first two-year period; this leaves 78,720 units still to be spoken for—and new applications are coming in every day.

Loans are to cover the cost of planning the housing projects. After erection, PHA is authorized to pay annual contributions to the projects; cities involved will fix special low tax rates on the developments to make the housing available to low-income families.

Construction To Slip in 1950

Building and construction volume based on dollar valuation of project contracts to be awarded will decline 4 per cent next year from this year's expected total of $9940 million in the 37 states east of the Rockies, says F. W. Dodge Corp.

An analysis by Thomas S. Holden, president, and Clyde Shute, assistant vice president, attributes part of the anticipated dollar-volume decline to an expected average 4 per cent drop in square-foot costs of buildings. The remainder will be caused by an estimated 3 per cent decline in physical volume.

A drop of 10 per cent in privately owned building and engineering works is anticipated, as is an 8 per cent increase in publicly owned building and construction.

Construction activity during October was off only 2 per cent, a less than seasonal decline from the September peak level, says the U. S. Department of Commerce. Further expansion of work on new housing, schools and hospitals largely offset small seasonal declines in most oth types of new construction. Tot value of new construction put place last month was $1856 milli compared with $1892 million f September and $1814 million for C tober, 1948.

By the end of last month, to value of all new construction put place this year amounted to $15,8 million, $200 million or 1 per ce more than the total for the same 19 period. The total for private co struction was 6 per cent lower t year, but public construction was by 26 per cent.

Hanford Project Expands

The Hanford, Wash., works of t Atomic Energy Commission will so begin the second phase of its $4 million postwar expansion progra

Since 1947, $230 million has be spent to produce a plutonium fab cation plant designed on a mass p duction basis. Plutonium is a ma ingredient of the atom bomb. In Ju such a plant was put into operati The second stage of the progra to take two years to complete, designed to step up production a bring about economies in operati About $65 million will be spent construction alone during this fis year which ends next June 30.

Hanford is a 620-square mile res vation along the Columbia river southeastern Washington. It has n been in operation seven years; d ing the war it was run by the M hattan District and E. I. du Pont Nemours & Co. General Electric took over Sept. 1, 1946, under a c tract expiring Dec. 31, 1950. Ab $350 million was spent on the proj during the war.

Price Index Overhauled

THE GOVERNMENT is overhauli its monthly consumers' price (cost-living) index to bring it more up date.

Bureau of Labor Statistics is sta ing a new series of surveys desig to make the index "a more use survey" of retail prices through the country. The whole job is pected to take about three years a cost between $4 and $5 milli

Officials said the new consum price index will not invalidate ind trial wage and price contracts wh are tied to the index figure. "continuity of the index which tends back before World War I not be broken and, therefore, remain legally sound for the purp of existing contracts." A number firms have tied labor and other c tracts to the index as a hedge agai fluctuating prices and cost of livi

Where the Steel Went

Automotive industry increases its lead as top consumer, construction is second

RECORD PRODUCTION of automobiles and protective buying of steel in preparation for the steel strike resulted in the automotive industry's taking 21.1 per cent of all finished steel shipped from mills in August.

That figure, highest for the year to that point, was recorded after the percentage take of the auto industry increased each month this year as it took up the slack resulting from reduced consumption by others.

No. 1 Consumer—The auto industry's August receipts of 21.1 per cent represented 1,040,572 net tons, and put the automakers in first place as a steel consumer, figures from the American Iron & Steel Institute show. While the August percentage was the highest for the year the August tonnage was slightly less than the year's high in March when the auto industry's take of 17.2 per cent was 1,-[illegible],641 tons. The difference lies in the fact that total mill shipments in March were at the year's high of 6,-[illegible],681 tons compared with 4,918,314 tons in August.

Construction Is Second—Relative position of importance as consumers in August was unchanged from that of July; the automotive industry was first; construction and maintenance second; containers third; and rail transportation fourth. The first two increased their take in August, but the last two cut theirs.

Show Decreases—Consuming classifications, in addition to containers and rail transportation, showing decreases in August from July include shipbuilding, oil and gas drilling, and finance.

Besides the automotive and construction industries, consuming groups that took more finished steel in August than in July include bolts, nuts, rivets and screws; contractors' products; aircraft; agricultural; machinery, industrial equipment and tools; electrical machinery and equipment; appliances, utensils and cutlery; and other equipment.

Jobbers, dealers and distributors received 835,922 tons in August, compared with 787,741 tons in July.

Exports of finished steel by mills reached 384,444 tons in August, highest for the year. The July figure had been 337,649 tons.

Export Controls Changed

The U. S. will control more closely the destination of American strategic products shipped to foreign nations.

The Commerce Department is placing additional export controls on about 100 strategic items. Controls on exports of another 50 classifications are lifted. Other changes are due.

Among products covered by new destination controls are refined industrial lubricating oils, crude asbestos and fibers, electrical generators, transmission and distribution apparatus, large electrical motors, mining and quarrying machinery, petroleum field and refining equipment, special types of puncture-seal tires, unmanufactured mica, some copper and bronze manufactures, x-ray apparatus and some types of machine tools and parts.

Commodities decontrolled include industrial conversion oil burners and oil-fired boilers, bauxite ores, platinum ore, portable electric tools, ophthalmic glass, glass fiber and products, pottery, refractories, certain abrasives, some asbestos products and several types of electric apparatus.

Too Much Government

EXPANDING scope of government control over private enterprise is contributing to the pervading pessimism as to the economic future. So says Harold G. Moulton, president, Brookings Institution, who spoke before the conference on production of the American Management Association in Chicago last week.

Government intervention in economic life, he says, is directed in large part toward prevention of business depressions "but it also embodies the conception that the government can promote a long-term economic development and achieve our national goals far better than can a system of private enterprise."

That concept, he says, found expression this year in the Spence Bill, vesting in the president "the power to formulate national production requirements in line with his conceptions as to which is necessary for the people's welfare."

Some Chicago Rail Rates Cut

RAIL freight rates on shipments of iron and steel products originating in the Chicago switching district, which includes Gary, and destined for Peoria, East Moline, Moline, Rock Island, Davenport and Bettendorf were reduced effective Nov. 7.

New rate, based on minimum quantity of 80,000 pounds, is 25 cents per 100 pounds to these cities. Rate previously in effect was 32 cents to Peoria and 33 cents to the others, minimum poundage being 40,000.

October Ingot Output Falls to 17-Year Low

STEEL production in October fell to the lowest volume for any month since July, 1932, says American Iron & Steel Institute. Output of ingots and steel for castings was 916,696 net tons, compared with 6,951,908 tons in September and 7,996,895 tons in October, 1948. The report for the latest month is subject to revision.

The reason that October's output was below any month in the 1946 general steel strike is that the 1949 stoppage began at the start of the month; in 1946 the strike began in mid-January and continued to mid-February. Thus the worst effects of the earlier strike were divided between two months. Total loss to production was 7,789,000 tons in 1946.

Current strike loss is expected to be about 10.5 million tons. October steelmaking tonnage is normally at the high point for the year. Last year more steel was produced in October than in any other month.

Assuming production of about 3 million tons in November and December operations at prestrike levels, steel output for 1949 should be about 75 million tons. This would mean a drop of more than 13 million tons from the 1948 total.

Steel Ingot Production Statistics

	Estimated Production—All Companies									
	Open Hearth		Bessemer		Electric		Total		Calculated weekly production	Number of weeks in mo.
	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.	Net tons	
1948										
9 mos.	58,366,672	93.2	3,028,637	77.4	3,669,929	90.8	65,065,238	92.2	1,662,372	39.14
Oct.	7,120,753	100.5	409,657	92.5	466,485	102.0	7,996,895	100.1	1,805,168	4.43
Nov.	6,925,043	100.9	411,161	95.9	461,354	104.2	7,797,558	100.8	1,817,613	4.29
Dec.	6,927,689	98.0	393,717	89.1	459,373	100.7	7,780,779	97.7	1,760,357	4.42
Total	79,340,157	94.9	4,243,172	81.2	5,057,141	93.7	88,640,470	94.1	1,695,495	52.28
1949										
1st half	41,254,823	98.0	2,372,458	92.1	2,298,064	75.8	45,925,345	96.3	1,775,236	25.87
July	5,307,471	73.8	300,236	68.2	171,415	33.1	5,779,122	70.9	1,307,494	4.42
*Aug.	6,101,499	84.7	355,335	80.6	257,910	49.7	6,714,744	82.2	1,515,744	4.43
†Sept.	5,993,951	86.1	350,356	82.2	247,601	49.3	6,591,908	83.5	1,540,165	4.28
†9 mos.	58,657,744	92.5	3,378,385	87.0	2,974,990	65.1	65,011,119	90.4	1,666,952	39.00
†Oct.	809,875	11.2	.....	...	106,821	20.6	916,696	11.2	206,929	4.43

* Revised. † Preliminary figures subject to revision.

For 1949, percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of Jan. 1, 1949, as follows: Open hearth 84,817,040 net tons, bessemer 5,191,000 net tons, electric 6,112,890 net tons, total 96,120,930.

No Capitulation

FTC attorney says out-of-court settlement proposal in line with commission's aims

CHARGES that the Federal Trade Commission would do an about-face by accepting respondents' proposed settlement in the steel pricing case are unwarranted, says Lynn C. Paulson, commission's trial attorney in the steel case.

"The proposal of the steel industry," Mr. Paulson told STEEL, "represents acceptance of the settlement terms which I outlined to respondents 18 months ago, and which at that time they were unwilling to accept.

Assured on Freight Absorption — "All that the steel industry would get from the proposed settlement is assurance of its legal right to absorb freight when such freight absorption does not unlawfully lessen competition. The commission, notably in testifying before the Capehart Trade Policies Committee in late 1948, has held the position that there is nothing illegal about freight absorption per se, and the contemplated agreement with the steel industry merely would acknowledge in black and white the right to absorb freight."

Too, the proposed agreement is right in line with the aim of Senator O'Mahoney when he introduced legislation to affirm the right to absorb freight.

"Otherwise the proposed settlement would not give anything to the steel industry. It would enjoin continued use of the basing-point, delivered-price system. It would make mandatory an f.o.b. mill price at each producing point, and sales at that price when consumers so requested. It would compel each producer to fix his own extras without reference to the rest of the industry. It would outlaw use of the American Iron & Steel Institute freight tariff book as an instrument in maintaining the basing-point, delivered-price system.

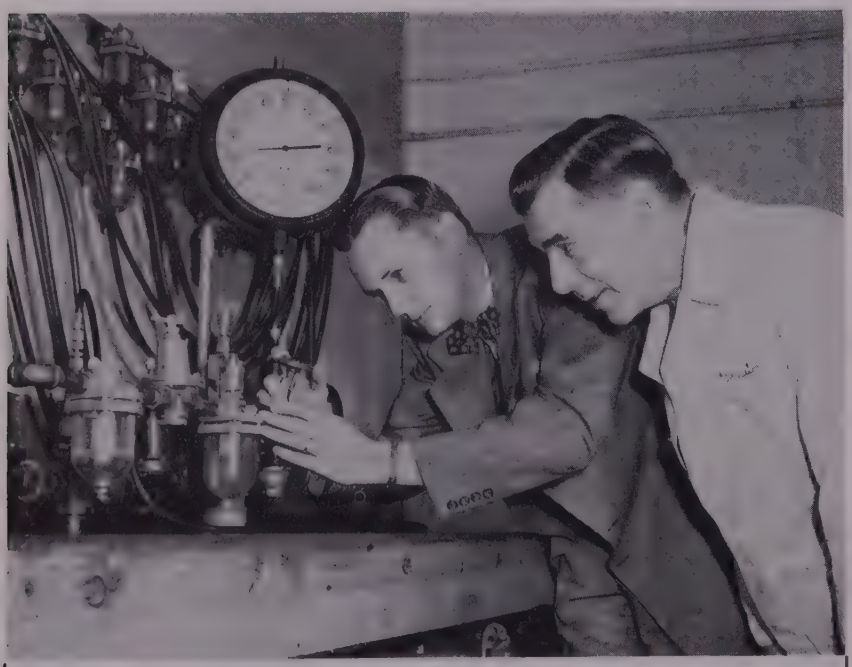
No Retreat — "Certainly the proposed settlement, if granted by the commission, would represent no capitulation by the Federal Trade Commission."

No date yet has been set for Mr. Paulson's presentation of the propoposed settlement for the approval of the commissioners.

Agreement Hit by Farm Head

Investigation of the Federal Trade Commission and the proposed agreement between FTC attorneys and steel companies concerning pricing practices is being asked by James G. Patton, president of the National Farmers Union.

In a long letter to Chairman Wright Patman (Dem., Tex.) of the House small business committee, the far group leader assails the proposed ou of-court settlement. He asks Repr sentative Patman to "use to the u most your great influence to bri about disapproval of this order."



ENGLISH MANUFACTURER VISITS NORGREN: C. Neil Norgren, assistant general manager of C. A. Norgren Co., Denver, shows W. A. Horswill results of a lubricator test in the Norgren engineering laboratory. Mr. Horswill, director of Shipston Engineering Co. Ltd., England, completed a two-week visit at the lubricator-filter-regulator firm

Steel Exports, Imports Gain

BOTH exports and imports of ir and steel showed gains in Augu from July figures. Commerce D partment's totals show a rise in e ports to 463,770 tons from 460,9 tons and imports to 6437 tons fro 2214 tons.

Sheets and plates exports ro about 10,000 tons and structu shapes 4000 tons in August. The gains were more than enough counterbalance declines in seve other categories. Scrap expo dropped sharply in August to 29,1 tons from 187,511 tons in July.

Reason for the rise in imports d ing August was the receipt of 50 tons of ingots. Changes in other c egories were slight with no oth group accounting for as much as 10 tons. Scrap imports continued to f in August and declined to 43,207 to from 52,359 tons a month earli Availability of domestic scrap a lower prices in the United Sta have been responsible for a stea decline in scrap imports since t first of the year.

July and August exports by prin pal categories were:

(Net Tons)

	July	Au
Semifinished	59,200	59,
Iron and steel bars	47,182	41,
Sheet and plates	175,522	185
Structural shapes	35,453	39,
Railroad supplies	21,477	22
Tubes, pipe, fittings	85,492	81
Wire products	32,684	28
Nails, other fasteners	3,969	4,
Total	460,979	463
Pig iron, ferroalloys	3,111	1
Scrap	187,511	29

Commerce Department's bre down of imports for July and Aug is:

(Net Tons)

	July	Au
Ingots, etc.	....	5,
Wire rods	65	
Iron bars, slabs	12	
Reinforcing bars	200	
Hollow bar, drill steel	....	
Other bars	65	
Boiler, other plate	322	
Sheets, etc.	27	
Tin plate, etc.	1	
Other hoops, bands	23	
Structurals, pilings	834	
Rails, fastenings	66	
Wheels, axles	2	
Pipe, tubes	240	
Round wire	5	
Flat wire, strip	140	
Telegraph wire	74	
Wire rope	96	
Nails, etc.	24	
Bolts, nuts, rivets	6	
Castings, forgings	7	
Die blocks, blanks	5	
Total	2,214	6,
Pig iron	....	
Sponge iron	....	
Ferromanganese	133	
Ferrosilicon	29	
Ferrochrome	195	
Scrap	52,359	43

ols Grow Older

bsolescence more costly than rikes, Tell Berna tells Tool ngineers

S of industrial production due to steel and coal strikes is far less the nation's loss of potential pro- on due to the obsolescence of ine tool equipment. Tell Berna, ral manager, National Machine Builders' Association, used this arison to illustrate his point e speaking to the Boston chapter e American Society of Tool En- rs in Boston Nov. 10.

. Berna explained that 43 per of machine tools now in use are years old or older and 95 per are over ten years old in design. erican industry is still operating ly with machine tools of war ge, the models of which were n in 1940," he said. "The ma- tools average one-third less in ctivity than the new models dis- ed by the industry at the Machine Show in Chicago two years ago. elay in replacing old machines odern equipment that turns out work for the consumer's dollar costly perpetuation of inefficien- Too many men in managament me that because a machine is in good running order it is still od machine."

e cost at which the machine s out the work is what counts, id. To achieve our goal of better s for more people at lower cost, s must be re-equipped with ma- s that make this lower cost pos- He concluded by reminding the engineers that "the tools of rday will never raise the living dard of tomorrow."

prentice Manual Available

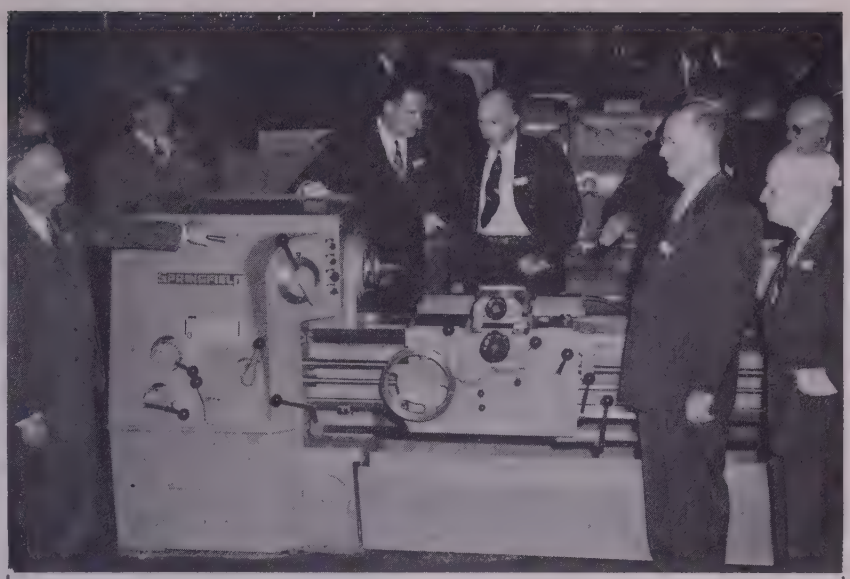
orking manual for setting up and ucting an apprentice training e is being made available to all try by National Machine Tool ers' Association, Cleveland.

specifies in detail the nature of work to be done by the appren- and contains samples of forms red, including the application for nticeship, the apprenticeship ment and work records required.

J. D. McDonald, vice president, er & Swasey Co., and president e association, points out the book signed to help companies setting full apprenticeship course and t to be used in connection with -term training courses.

5 Million for Machinery

chinery and equipment accounts early one-third of the dollar vol-



HOST AT ANNIVERSARY: Paul A. Montanus (left), president, Springfield Machine Tool Co., Springfield, O., listens as son Richard (hand on headstock) explains new model engine lathe to Guy Hubbard, machine tool editor of STEEL. Among 60 machinery men and editors participating in the Springfield Co.'s 25th anniversary celebration of the founding of the American Machine Tool Distributors' Association were R. W. Tornquist, president, Tornquist Machine Co., Los Angeles, and Al G. Bryant (right), past president of distributors' and builders' associations

ume of Marshall Plan spending approvals that were announced during the week ended Nov. 5.

Out of total approvals of $17.6 million, $5.6 million covers authorizations for purchase of machinery and equipment. Latest approvals bring total for Europe to $7087 million.

Included in the commodities approved for purchase for Europe are: Railroad transportation equipment, agricultural equipment, motor vehicles and parts, iron and steel mill materials and industrial machinery. Authorizations by countries are: Austria, $52,000 for agricultural equipment; Benelux, $1.4 million for metalworking machinery; France, $1.7 million for construction and mining equipment, industrial machinery, generators and motors, engines and turbines and electrical apparatus; Iceland, $225,000 for agricultural equipment, construction and mining equipment, engines and turbines, electrical apparatus and industrial machinery; Ireland, $500,000 for industrial machinery; Norway, $2.5 million for tractors, industrial machinery, construction and mining equipment and generators and motors; Turkey, $72,000 for construction and mining equipment and electrical apparatus.

Lone Star To Build Pipe Plant

LONE Star Steel Co. will build a $1 million cast iron pressure pipe plant at its Lone Star, Tex., facilities.

The proposed pipe plant, to be completed in six to eight months, will provide an outlet for much of Lone Star's pig iron production and will supply an expanding market for such pipe in Texas. No cast iron pressure pipe is now being produced in the state. The proposed plant will not compete with stack or soil pipe being turned out by Texas foundries. The pipe plant will become part of the foundry facilities of Lone Star's new steel mill, plans for which are being completed.

Sponge Iron Reduction

EXPERIMENTAL testing of most efficient method for sponge iron briquet reduction is being conducted in a small open hearth (17 by 30 inches) by Steel Processing Co., Pittsburgh, Ft. Pitt Bridge Works subsidiary. N. J. Urquhart, conducting the experiments, says he is using a mixture of 2 per cent oxygen and oil and is getting a substantial reduction in melting time. He cites, for example, that a 60-pound charge has been melted down in 17.6 minutes with a 12 per cent reduction in use of oxygen and oil. Oxygen is introduced in the middle of oil flow to achieve long luminous flames instead of normal oxidizing. The small open hearth uses neither regenerator nor recuperator.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, S*

One consolidated appropriation bill is to cover federal spending next year. If plan works, fiscal 1951 appropriations will be gaged by Treasury estimate of income

IF YOU object to this year's big increase in federal spending—and you probably do—it will pay to look up your congressman now that he is home and in a mood to hear you.

There is a special reason right now for letting him know how you feel about the soaring cost of government: Congress for the first time, in the session immediately ahead, will know what it is doing about appropriations. If the members of Congress next year again vote expenditures up another notch they will do it on their own responsibility. They will not be able to blame it on the administration.

Next year, instead of the customary multiplicity of appropriation bills, one consolidated general appropriation measure is supposed to cover everything except deficiencies and supplementals. Under the new method there shouldn't be groans of anguished surprise like those heard when congressmen discovered at the end of this year's session that they had put the country much farther in the red. If the new system works as is promised, a reverse pocess will be employed next year. The starting point will be a Treasury estimate of federal income during fiscal 1951. The consolidated appropriation is to be gaged by that benchmark.

The appropriation for fiscal 1951 also is to be set up on a performance basis; this means a definite amount of money for each individual program, activity or project. Congressmen will know exactly what they are voting for each item—a marked contrast with the past when they often learned at a later date that money they appropriated was not spent as they had intended.

Under the new system perfect results cannot be expected; the business of the United States government is too vast and complicated. But the system will permit a more businesslike approach than has been possible before. Though the consolidated appropriation bill—drafted on an individual performance basis—will be about the size of a big-city telephone directory, everything will be in it—right down to the total. There should be no occasion for surprise or chagrin if congressmen find at the end of the next session that they again have voted for a deficit. If they do, the vote will be conscious and deliberate. Blame or credit for whatever is done will devolve squarely upon Congress.

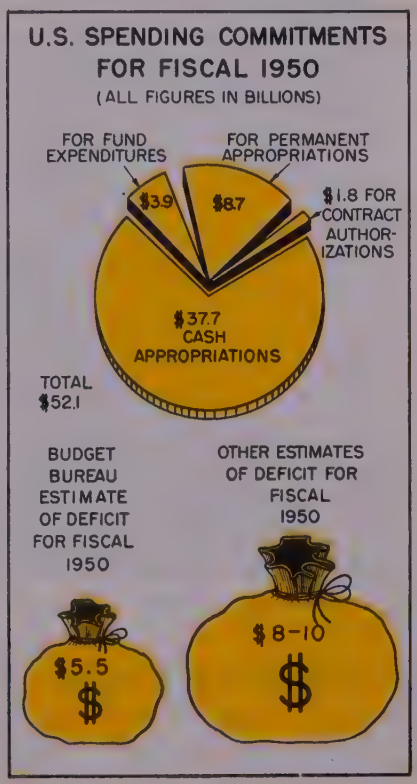
You will do well to discuss this matter of spending with your congressman, for he will find himself again under strong pressure to vote large new spending programs next year. Among measures to be pushed is the huge soldiers' bonus bill, the federal aid to education bill, the cooperative housing bill, and the national health bill. The social security expansion bill which passed the House is due for Senate action.

If you favor economy and balancing of the budget and some slight reduction in the national debt, it certainly will help to so inform your congressman. It should help build up his morale so that he can better resist new spending demands next year.

Fiscal Pictures Looks Bad

FISCAL PICTURE of the year ending next June 30 is the worst in peacetime history, and it is not yet generally recognized.

Most informed observers estimate



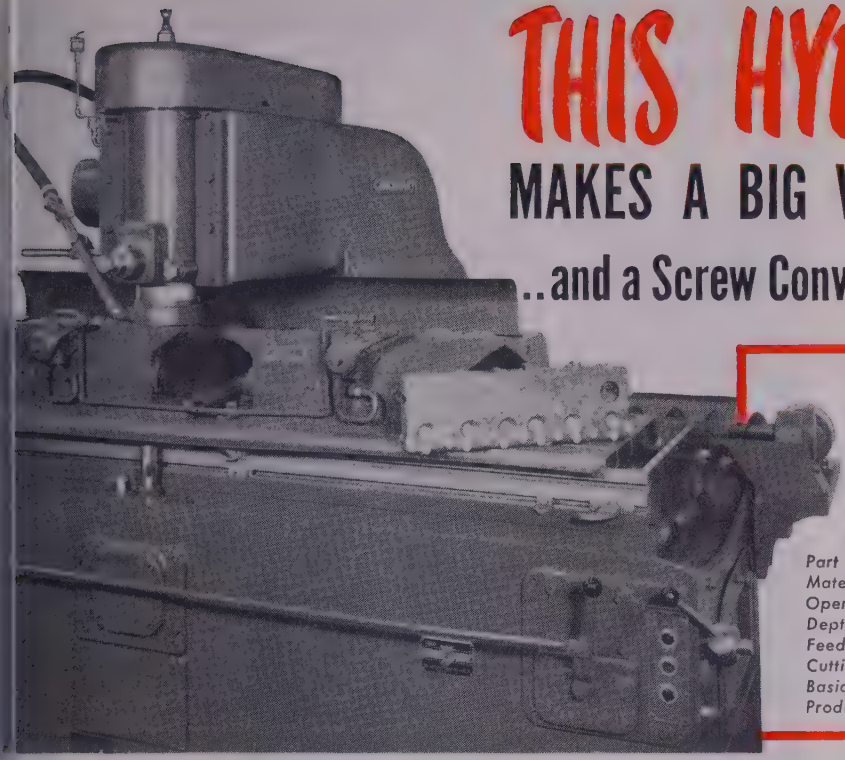
that the deficit this year will be f $8 to $10 billion. One governn economist in a particularly good p tion to judge—puts it at $10 bi "or more." The reason is twof Higher expenditures and reduced eral income.

Unfortunately, people are led to lieve that the cost of governmer represented by cash appropriat voted by Congress each year. On basis, cost of government in this cal year would come to $37.7 bil But that does not include expe tures which will be made under manent indefinite appropriations such items as interest on the tional debt, tax refunds and sinl fund requirements. It does not clude expenditures from the s security, railroad retirement and employment insurance funds wl while they are supposed to be n from "funds," actually require sp ing, by the Treasury. And it not include contract authorizat against which payments are n mostly in subsequent years.

So, instead of $37.7 billion, sp ing commitments that had been thorized when Congress adjou came to $57.1 billion. They inclu $37.7 billion for cash appropriat $8.7 billion for permanent indef appropriations, $3.9 billion in penditures from funds, and $6.8 lion in contract authorizations. you deduct $5 billion from the tract authorizations as payabl subsequent years, that means a expenditures of $52.1 billion in f 1950.

Unfortunately, there is no m of estimating accurately the d that will turn up next June 30 cause there is no accurate info tion about federal income in period. The only certainty is it will be lower because of lowe collections from reduced corp and individual earnings in cale 1949. Another reason why f income cannot be estimated accurately is the kind of bookl ing tabulations the governmen leases to the public: You hav be well fortified with other info tion in order to reach any s conclusions. Take the Bureau o Budget Nov. 1 estimate of $38 b in budget receipts for this fiscal STEEL learns that while this tot cluded tax collections under the road retirement setup, it did nc clude social security and unem ment insurance tax collections.

Chief significance of the N statement of the Bureau of



THIS HYDROMATIC

MAKES A BIG VOLUME OF CHIPS

...and a Screw Conveyor Takes Them Away

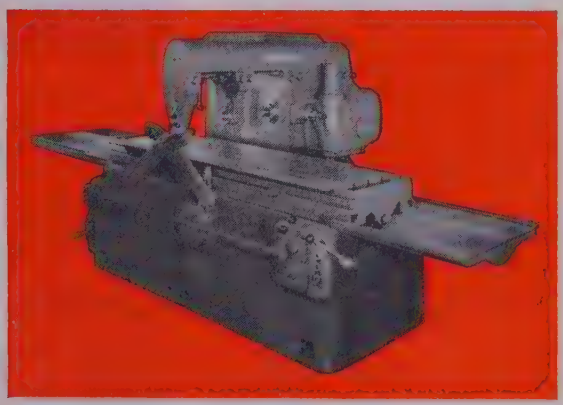
Left: CINCINNATI Hydromatic Milling Machine equipped with vertical retractable spindle, two air operated fixtures, and screw conveyor chip disposal for a high speed carbide milling operation. One of the parts is in the foreground, on the machine table.

Part name.....Cylinder head
Material ..... Aluminum
Operation .....Mill bosses
Depth of cut.....3/16"
Feed.....60" per minute
Cutting speed.....2500 feet per minute
Basic machine....No. 56-72 Plain Hydromatic
Production.....76 per hour

A big volume of chips implies high speed and feed rates, and stamina to withstand continuous operation. The CINCINNATI Hydromatic Miller illustrated here has all these qualifications, plus an automatic chip conveyor which solves the problem of getting rid of the chips without stopping production. ¶As you might suspect, Cincinnati Application Engineers had a hand in developing this equipment. Starting with a standard No. 56-72 Hydromatic bed-table unit, they added a special headstock and vertical head having retractable spindle, two air operated fixtures, and a power screw conveyor chip removal unit.

Hydromatic's two-way feed lays the ground work for the twin fixture technique — loading and unloading one while the part in the other is being milled. The retractable spindle feature saves the surface finish. The chip conveyor relieves the operator of an unpleasant job.

Equipment of this type can reduce costs in many shops . . . perhaps yours. Our Application Engineers will help you decide.



CINCINNATI Plain Hydromatic Milling Machine. Write for catalog M-1372-1 containing complete details and specifications.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Budget is seen in the estimate that the deficit as of next June 30 will be $5.5 billion. In January the budget estimate of this deficit was $900 million. Thus the administration is tacitly willing to admit that there has been a drastic worsening in the nation's fiscal position. Even so, the $5.5 billion estimate is regarded as definitely on the low side.

Four Spot Assistance Areas

FOUR NEW areas have been added to the list of distressed communities that can receive aid under the President's spot assistance program.

They are Altoona, Pa., Johnstown, Pa., L'Anse, Mich., and Honolulu, T. H. All have unemployment of 12 per cent or more. At the same time five areas—Jackson and Port Huron, Mich., the Upper Peninsula of Michigan, Manchester, N. H., and Burlington, Vt., have been deleted from the list. Thirty-four areas remain.

Under a decision reached as a result of the steel strike, no communities will be entitled to help because of idleness of men engaged in strikes against their employers.

More Telephones, More Business

LONG-TERM beneficial effect on business is expected to result from expansion of rural telephone service authorized by the new amendment to the Rural Electrification Act.

It is an axiom that installation of phones expedites the transaction of business and brings about a greater volume of business than otherwise would be placed. Up to this time about 40 per cent of farms have telephone service; this figure should be materially increased over the next few years as a result of federal aid. The amendment permits the Rural Electrification Administration to loan $25 million this fiscal year to private companies and co-operatives for expanded farm telephone service.

"New" White House Costly

STRUCTURAL STEEL required to renovate the White House may set a new high record for cost per ton installed.

About 500 tons of shapes and 80 tons of reinforcing bars and mesh will be needed. The job will be the reverse of the usual procedure: The building already has been erected and the steel now must be placed. That means extensive tailoring to fit unusual conditions. Designs have not yet been completed by the Public Buildings Administration. Cost of the work is $4,160,000—recently estimated by Congress.

Contractor for doing the work on a fixed-fee basis is John McShain Inc., Philadelphia, with a figure of $100,000. The McShain firm agreed to complete the project in 660 days after getting started. The whole undertaking is in charge of a Commission on Renovation of the Executive Mansion headed by Sen. Kenneth McKellar (Dem., Tenn.). Maj. Gen. Glenn Edgerton, who has headquarters in the White House, is the commission's executive director.

New Army Chief of Ordnance

BRIG. GEN. Elbert L. Ford has been sworn in as Army Chief of Ordnance with the rank of major general. He succeeded Maj. Gen. Everett S. Hughes who retired after

MAJ. GEN. ELBERT L. FORD

31 years with the Army. General Ford had been commanding general at Aberdeen Arsenal since July, 1948. A graduate of West Point, his major experience with the Army has been with ordnance.

Export Clinics To Help Business

LATEST MOVE by the Economic Administration in its program to help small business get more orders under the Marshall Plan is organization of "export clinics" in about 500 cities.

These will be sponsored by chambers of commerce and other local-interest organizations and conducted by export specialists and other business executives who volunteer their services. The setup will permit small business to get full information about Marshall Plan opportunities without leaving their home towns. Unde fast-moving schedule, most of proposed export clinics should be tablished within a few weeks.

The plan is workable. Little Ro Ark., Worcester, Mass., and Milw kee were test cities where the p posal was received enthusiastica Many local export specialists business executives volunteered serve as "counselors" in the clin High caliber men head the lo groups: The organization at Li Rock is presided over by Willi M. Sheperd, director of indust development, Arkansas Power Light Co.; that at Worcester by W liam H. Lee, chairman of the Fore Trade Council of the Worce Chamber of Commerce; and that Milwaukee by Dr. Roy J. Colb director of the Bureau of Commu Development of the University Wisconsin.

The new field counseling organ tion is being created under Bert White, head of ECA's Office of Sm Business. His headquarters are 800 Connecticut Ave. N. W., Wa ington 25. Aides who are doing actual work of establishing the port clinics" are William Haines, ing deputy assistant to Mr. Wh C. A. Richards, export consult and John Dechant, in change of counseling.

Small Business Assist

To further small U. S. firms getting business under the Mars Plan, ECA will publish lists of bona fide importers in each of participating countries.

The first list, with names and dresses of Austrian importers, been completed and will be re for distribution shortly. In all c the importers will be listed to s the commodities in which they cialize. You can get the lists field offices of the Departmen Commerce, through local cham of commerce, and from ECA.

Big Business Shackles No Help

"I am sure you will discover forging more chains on big bus does not liberate small business," Celler subcommittee, House Judi Committee, was told by a re Cleveland business man during monopoly hearings.

He is W. W. Vandeveer, fo president of the Allied Oil Co. recently merged with the Asl Oil & Refining Co. It was not petition but the prospect of ha to pay $4 million in taxes on death of the owners that necessi sale of the company. Mr. Va veer urged revision of tax law allow small companies to buil adequate cash reserves.

rope's Deadline: Economic Unity in 1950

Hoffman and Acheson warn that Marshall Plan aid may stop if economic unification is not begun next year. European reaction is lukewarm to icy

STERN Europe has a new dead- The United States, in effect, is ng: Either unite economically or : expect new Marshall Plan help 950.

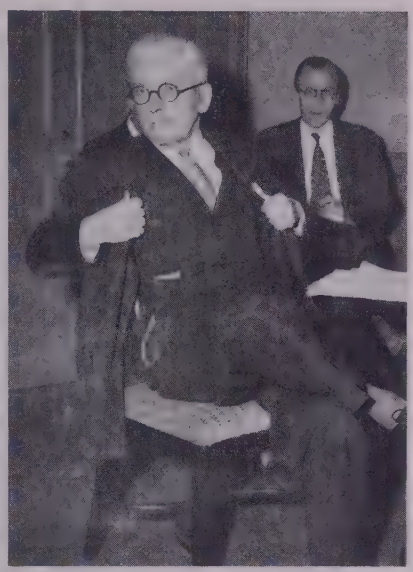
CA Administrator Paul G. Hoff- and Secretary of State Dean eson are urging economic union political union eventually. Mr. man warns Europe to "have y early in 1950 a record of ac- plishment and a program which ther will take Europe well along road toward economic integra- ". The advantages of economic n can be readily seen in the ed States, Canada and Australia, Organization for European Eco- c Co-operation was told at its s meeting.

ee Market Aids Prosperity—"In U. S. a single free market of 150 ion consumers has been indispens- to American prosperity," says Hoffman. "The creation of a anent, free trading area in Eur- would accelerate the develop- of large-scale, low-cost produc- industries, would make the ef- ve use of all resources easier, d set in motion a rapid growth roductivity." Western Europe's lation is 270 million.

uropean reaction is lukewarm to y: The Benelux nations favor ex- on of the idea of their moderate omic union. This group is al- y plagued by the specter of over- uction. Benelux exports are king because of high tariffs, cur- y complexities and barter trade. in says it cannot join in an all- pean free trading area because ould disrupt her arrangements countries in the British Com- vealth.

o Much Steel—Europe's steel in- ies, in defiance of economic con- ations, are overexpanding be- of political motives, says the committee of the Economic mission for Europe. Already ba- eel production is more than ade- .

ished steel output will be rplus when facilities now under ruction begin operations. De- this Britain is building a basic plant in Wales. Every ERP n is planning, building or has built finishing facilities. Ger- steelmen are particularly criti- f the way uneconomic steel capacity is rising behind the protection of national boundaries.



INDUSTRIAL AMBASSADOR: Sir Steven Bilsland, chairman of the Scottish Council and one of Scotland's leading businessmen, came to the U.S. to encourage firms to set up branches and factories in Scotland, fast becoming Britain's power center. He says several American companies have already agreed to set up factories in his country

U. K. Output at Full Tilt

The United Kingdom is the only nation in Western Europe whose steel producers are still going full tilt. Reason: Commonwealth areas, sewed up in the British contract pocket, are still short of steel.

Full production is assured until the end of the year in all categories of steelmaking. Orders now on the books for sheets and plate guarantee capacity operations until well into 1950 for facilities making these products. Automakers are taking most of the sheet, shipbuilders most of the plate. When shipbuilding declines—signs indicate it will sometime early next year—the slack in demand for plate will be taken up by producers of power plant equipment whose order backlog is large. As of Sept. 30 shipbuilders in 1949 had built or were building vessels with an aggregate tonnage of 2,095,217 tons.

Latest expansion program in British steel is a $1.4 million maintenance and engineering plant at Machynis, Llanelly, South Wales. This is a co-operative project, designed to centralize repair facilities for all the South Wales steel industry.

Exports of steel and steel products are running ahead of target figures, account for nearly half of all British shipments overseas. One phase of the latest economy program is the offer of financial help to exporters to cover risks incurred in promoting business in hard currency countries, particularly the U. S. The rest of the government's $700 million economy program is getting an apathetic reception from business.

Minimum export prices per gross ton on a few steel products are: Merchant bars under 3 in., $73.08; merchant bars 3 in. and over, $66.92; beams, $65.12; plates ⅜ in. and over, $66.22; boiler plates, $72.82.

French Production Slips

French steel production is slipping. For September it dropped to 94 per cent of the scheduled output for the present year, against 105 per cent in May and 99 per cent in June.

A second battery of 30 coke ovens is being constructed at the Hagondange plant in northeastern France. At the Isbergues works of Societe de Chatillon-Commentry & Neuves-Maisons, construction is proceeding on a new mill to produce auto sheets. This addition will double the plant's present capacity. The last of six blast furnaces at the Roechling works in the Saar have been blown in.

Big Australian Power Plan

The largest public works project in Australian history was begun Oct. 17 near Cooma, New South Wales. It's a hydroelectric program to harness the snow-fed waters of the Mt. Kosciusko region. It will generate 1,720,000 kw, nearly as much as all the power stations in Australia can produce today. First power will be available within a decade, water for irrigation much sooner. To aid all power consuming companies in Australia, the project will particularly help the country's infant aluminum industry.

First part of the power plant will be built on the Tamut river, will provide at least 720,000 kw, will cost $173,250,000. The entire project, including transmission lines, will cost about $450 million.

Belux Cuts Export Prices

The Belgo-Luxemburg union has cut its export steel prices about 12 per cent to meet competition and realign its prices following devalua-

tion. Steel exports are still sluggish.

They limped to over 300,000 tons in September, but this is the second lowest total for the year. August shipments were worse. The outlook is gloomy because Britain is paring its imports of ingots from Belgium. These averaged some 70,000 tons per month during the first eight months.

Only 34 blast furnaces are in operation in Belgium. The Rodange works, largest in Luxemburg, have nearly stopped operations although modernization of the rolling mills is continuing. The September output of steel ingots and castings in Belgium increased from 295,000 tons in August to 301,000 tons, but decreased again to 292,000 tons in October. Production in the past three months was the lowest since June, 1948.

ECA Projects Aid Italy

An industrial project to provide machinery and equipment for RIV Officine di Villar Perosa, an Italian producer of antifriction bearings and other goods, now has ECA approval.

Old equipment will be replaced and production costs reduced under the project which calls for $1,352,000 in ECA funds. Installation expenses of $648,000 will be met by the company.

An Italian shipbuilding program of 49 ships aggregating 220,000 gross tons will get under way following an ECA grant of $60 million to Italy. The money will be used to finance the Mar. 8 Italian subsidy law.

The capacity of refinery at Porto Marghera near Venice will be more than doubled under an expansion project. Estimated cost of enlarging and modernizing the facilities of Societe Raffinaxione Olli Minerali is $6.4 million, including $2 million in ECA funds. The remainder will be provided by the company.

Meehanite Institute Meets

SYMPOSIUM on the production of nodular Meehanite castings which included a complete analysis of the material, methods and procedures and the study of future sales potential occupied the spotlight at the 24th annual meeting of Meehanite Metal Institute in Cleveland Nov. 2-5. More than 150 foundry representatives of over 35 companies heard 31 papers presented covering all phases of foundry operations.

Oliver Smalley, president, Meehanite Metal Corp., New Rochelle, N. Y., was presented a gold medal plaque by the institute. He has guided his company for 25 years and has expanded its operations throughout Europe, Africa, South America and Australia.

....And Kiss Your Wife Goodbye

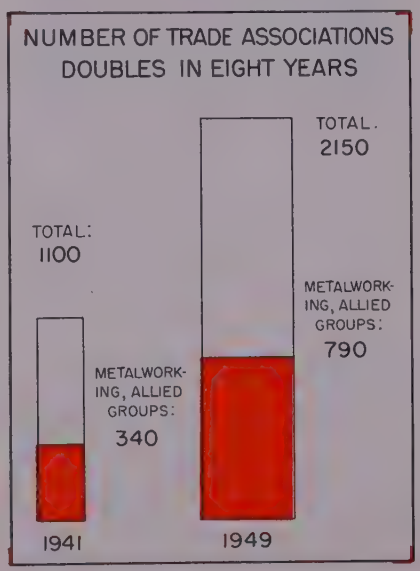
Conventions, 2400 of them, draw more than 12 milli visitors annually. Many sponsored by metalworking a allied industrial associations. Number doubles since 19

PACK your bag and confirm transportation space. You and some 240,000 other people may be attending one or more of about 60 metalworking conventions and shows to be held in the next 30 days.

An average of 4000 persons have or will convene at each of 720 meetings and exhibits in 1949 sponsored by metal product, transportation, public utility, petroleum, coal and gas associations. There will have been 2400 conventions and expositions backed by all types of industry organizations in 1949, with an average attendance of 5300 at each. These gatherings include both regional and national affairs.

More Meetings in 1950 — In 1950 there will be a few more metalworking conventions and shows than in 1949, but total attendance will slip to a shade below the 1949 record of around 2,880,000. The convention business is a depression business, says Edward C. Brennan, executive vice president of the Cleveland Convention & Visitors' Bureau. There are always more meetings when industry needs more sales.

The number of metalworking conventions and exhibits has increased rapidly since the war. This chart shows why: There are more than



Source: U. S. Department of Commerce.

twice as many metalworking trade groups now than in 1941.

The 790 metalworking associations account for 36 per cent of all types of industry associations, hold 30 cent of all major business meetir attract 15 per cent to 20 per cent the total attendance.

Lists 3805 Groups—Department Commerce, Trade Association D sion, lists 3805 associations. This éludes the industry categories, bet business bureau, chambers of co merce, fraternal, religious and v erans groups and labor unions. told, these groups hold 1000 ma conventions a month. Meetings fraternal, religious and veterans sociations have fallen the most sha ly because of rising costs.

Chief convention cities incl Philadelphia, Atlantic City, N. New York, Cleveland, Chicago and Louis because these municipali have the largest hotel and meet facilities. Cleveland is host to conventions a year, more than 50 them in metalworking. The In national Association of Conven Bureaus says that the average per delegate in principal cities is days, that the delegate spends $1 hour during his visit.

Strike Boosts Used Drum Volu

THE STEEL strike has spurred mand for reconditioned drums, Morris Hershon, president of the tional Barrel & Drum Associa which met in New York last w

Drum container manufacturers curtailing production and putting tomers on a quota basis. Reco tioned drums, which sell for 25 cent less than new ones, are at a premium. The situation w be far more serious if the war not accustomed industry to use containers. Mr. Hershon says hundreds of plants have been eq ped to recondition drums today.

LP-Gas Industry Begins Drive

PLANS for nationwide promoti program to consolidate its gains further expand its markets is nounced by the liquefied petrol gas industry, newest branch of oil industry. Directing the camp is the National Committee for gas Promotion, which organized week in Chicago.

John C. Pankow, sales director troit-Michigan Stove Co., is chai of the group and M. L. Trotter, p

, Carolina Butane Gas Co., Colum- S. C., vice chairman. Robert E. len, Chicago, is secretary.

nbracing advertising, publicity, loyee training and special public ions, the program will be finan- by voluntary contributions. It is onsored by Liquefied Petroleum Association, Natural Gasoline ciation of America and Gas Ap- ce Manufacturers Association.

istry Can Cut Costs 33 Ways

USTRY can cut costs in 33 major s. This is disclosed in a survey 5 companies by Walter Mitchell research director of the Con- ership Foundation, research arm ontroller's Institute of America. ssibilities of reducing costs fall our categories: Inventory reduc- and subsequent control, reduc- of production costs, cutting ad- strative overhead, expanding . Industries represented in the ey include automotive, oil equip- , machinery, farm equipment, er manufacturing, petroleum re- g, paints and plastics.

ggestions for reducing inventory s include recommendations for and better uses of economic asting and market research, con- of stocks in distributors' hands prevention of damage and pil- ge.

reduce production costs, the ey finds the most popular ods are: Scrap loss control, bud- control, incentive plans, increased ction, product simplification, standardization, plant mechani- n, more materials handling.

ministrative overhead may be re- d by better use of personnel and ements in accounting procedures.

increase sales, companies sur- d have expanded their sales s, increased their advertising, ed new outlets, expanded mar- research.

Slates Policy Projects

DIES on how to increase the flow nds into equity capital, and how elp world economic reconstruc- are scheduled by Committee for omic Development as two of six cts on which it will issue policy ments in 1950.

rion B. Folsom, treasurer of man Kodak Co. and new chair- of CED's research and policy mittee, and Beardsley Ruml, vice man of the committee, report ther four subjects are: Freedom national security, how to raise wages, tax and expenditure policy e federal government, agricul- policy.

Diemakers Hopeful

Competitive conditions bringing return of annual models, necessitating more retooling

RETURN to strong competitive conditions among makers of mass produced products means a higher business volume for tool and die makers.

More regular model changes in consumer goods and increased need for greater efficiency in production equipment spell optimism to members of the National Tool & Die Manufacturers Association who met in New York for their annual convention. The members of the association make special tools, dies, fixtures, molds, gages, jigs and special machinery.

Shipments $271 Million—The industry as an arm of the U. S. mass production economy shipped $271 million worth of products in 1947, said Centre W. Holmberg, president of August W. Holmberg & Co. Inc. of New

CENTRE W. HOLMBERG

York and new NTDMA president. He quoted Census of Manufacturers figures. The association's Directory of Special Tooling Services lists the products of 750 tool and die shops.

Among the convention speakers was E. Slater, Slater & Crabtree Ltd., Wakefield, England, a member of the British Tool & Gagemakers Association. "American tool and die shops are 20 years ahead of comparable British shops," he said.

New Officers—In addition to Mr. Holmberg, officers for the coming year are: First vice president, Herbert F. Jahn, president of B. Jahn Mfg. Co., New Britain, Conn.; second vice president, R. H. Cope, manager of Bunell Machine & Tool Co., Cleveland; secretary, Alfred Reinke, president of Gus Reinke Machinery & Tool Co., Hillside, N. J.; treasurer, Herbert Harig, vice president and treasurer, Harig Mfg. Corp., Chicago. George S. Eaton is still executive secretary.

CALENDAR OF MEETINGS

Nov. 14-18, Refrigeration Equipment Manufacturers Association: Sixth refrigeration and air conditioning exposition, at Atlantic City Auditorium, Atlantic City, N. J. Association headquarters are at 1346 Connecticut Ave. N. W., Washington.

Nov. 15, American Supply & Machinery Manufacturers' Association and National Supply & Machinery Distributors' Association: Cosponsors of the second industrial distribution forum, Congress Hotel, Chicago. American's headquarters are at 1108 Clark Bldg., Pittsburgh.

Nov. 16-17, United States Inter-American Council of Commerce & Production: Conference on the effect of currency devaluation on inter-American trade, at Mayflower Hotel, Washington. Council headquarters are at 1615 H. St. N.W., Washington.

Nov. 16-18, Industrial Hygiene Foundation: 14th annual meeting, Mellon Institute, Pittsburgh.

Nov. 17-18, Magnesium Association: Quarterly meeting, New York. Association headquarters are at 30 Rockefeller Plaza, New York.

Nov. 25-26, American Foundrymen's Society: New York regional conference, Syracuse University, Syracuse, N. Y. Society headquarters are at 222 W. Adams St., Chicago.

Nov. 26, American Iron & Steel Institute: Regional technical meeting, Thomas Jefferson Hotel, Birmingham.

Nov. 28-Dec. 2, American Society of Mechanical Engineers: 70th annual meeting, Statler Hotel, New York. Society headquarters are at 29 W. 39th St., New York.

Nov. 28-Dec. 3, 22nd Exposition of Chemical Industries: Grand Central Palace, New York.

Nov. 30-Dec. 2, Society for Experimental Stress Analysis: Annual meeting, Hotel New Yorker, New York. Society postal address is Box 168, Cambridge 39, Mass.

Dec. 1-2, Council of Profit Sharing Industries: Second annual conference, Hotel Roosevelt, New York. Council headquarters are in the First National Tower, Akron.

Dec. 2, American Council of Commercial Laboratories: Meeting, Hotel Statler, Washington. Council headquarters are at 318 Evans Bldg., Washington.

Dec. 6, Material Handling Institute: Annual meeting, Hotel Commodore, New York. Institute headquarters are in the Clark Bldg., Pittsburgh.

Dec. 8-10, American Institute of Mining & Metallurgical Engineers: Seventh annual conference of Electric Furnace Steel Committee. Institute headquarters are at 29 W. 39th St., New York.

Dec. 9, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

Dec. 12-15, National Warm Air Heating & Air Conditioning Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Society for Savings Bldg., Cleveland.

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-13, Society of the Plastics Industry, Reinforced Plastics Division: Meeting, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

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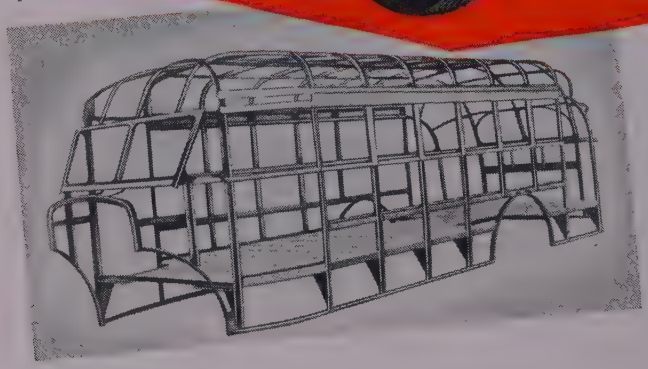
Pictures courtesy of Oneida Products Corp.



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A. H. ALLEN Detroit Editor, STEEL

Mirrors of Motordom

Preview of new auto models offered as most builders taper off on production. Most producers optimistic for next year, but 10 to 15 per cent drop would not be surprising

DETROIT

THOUGH the outlook is improved resumption of steel shipments to or plants in good volume inside hree to four weeks, the remainder 1949 has been pretty well writ- off because of the interruption supplies and depletion of inven- already experienced, plus model ngeovers now under way or short- to be undertaken. Even though e changeovers in many cases in- e no important changes in dies ooling, there is no disposition to them through as long as ma- als stocks are so badly unbal- ed.

ow may be as good a time as to look a little beyond the seven ks remaining in the current year he effort to summarize the out- and planning for individual pro- ers. At the outset it can be said all are optimistic about 1950. y see a tremendous retail market et unsatisfied and while they are looking for the production evement of 1949 they will not a decline of much over 10-15 cent from 6.4 million units likely e realized by Dec. 31.

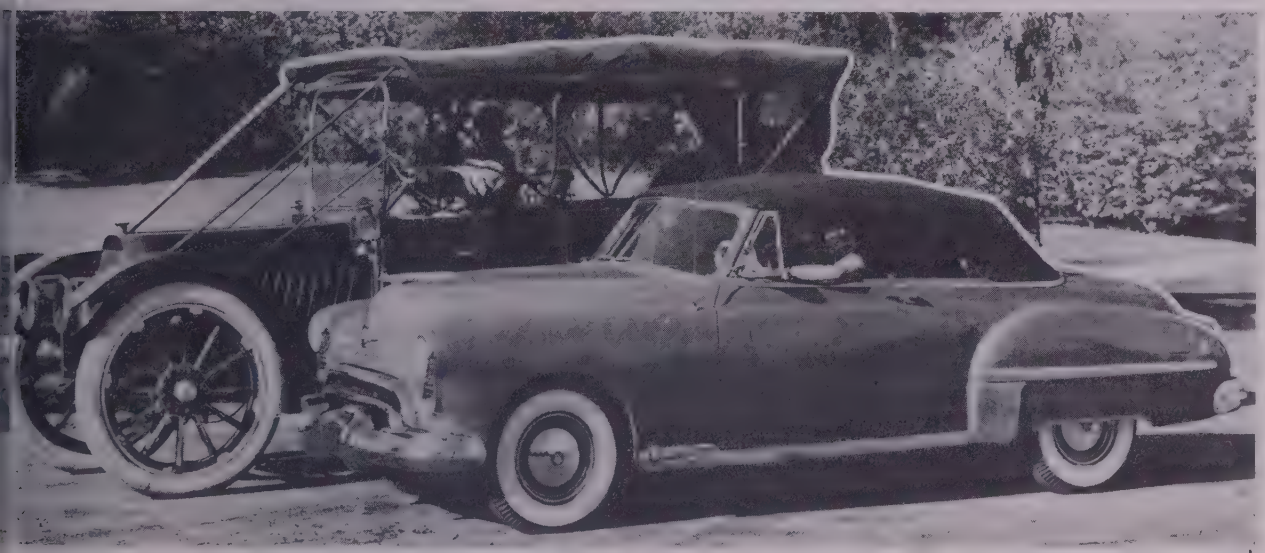
he abrupt slash in schedules ving out of the steel strike could react favorably in several ways. First it will provide impetus to clear out remaining stocks of 1949 models, perhaps persuading some buyers to go ahead with purchases of currently available types rather than wait for the 1950 series which may meet some delay in reaching full output. Secondly it could help to build up a backlog for January and February sales, normally slow months.

At any rate, here is a rundown on the industry as things stack up for the moment:

Buick—Assemblies for the year have hit 360,000 and will continue to the limit of steel stocks, perhaps being trimmed to four days per week shortly. Emphasis continues on the series 40 Special, now accounting for over half the total. A new body will be introduced on the series 50 Super model late this month, the General Motors "B" body, first appearing on the Special. The series 70 Roadmaster will feature a new body shell in its 1950 version, although this may be delayed until December. Engine modifications on cars carrying the Dynaflow transmission may become standard, in view of the fact nearly all buyers are ordering this transmission. Completely new Buick engine is a good possibility for at least one of the 1951 models. Prices are not likely to change much, since the division now brackets the medium to high-price field solidly.

Cadillac—Mid-December is seen as the starting date for 1950s, which would not permit much more than limited dealer sampling before year-end. The new GM "C" body will be carried throughout the line except for an entirely new lower-priced model which will use the "B" body and help to attract buyers further down the price scale. A redesigned type of automatic transmission, combining features of the Hydra-Matic and Dynaflow, is in the works; its appearance on 1950 jobs has not been confirmed. Completely new radiator grille and decorative interior and exterior treatment will be apparent on all series. Assemblies thus far this year are close to 78,000, or 40 per cent ahead of 1948.

Chevrolet—Most assembly operations have dropped to a four-day week, with a model change looked for momentarily. Bodies will be unchanged from the present basic "A" type, except for decorative treatment. Big feature next year will be the deluxe line, carrying an engine of slightly higher horsepower and a torque-converter automatic transmission, to sell for $100-$150 extra. Division already has built more than 1 million passenger cars and 350,000



GOOD OLD DAYS? These two Oldsmobiles were built 39 years apart. The 1910 "Limited" four-door touring car weighs 5000 pounds, cost $5000, f.o.b. Lansing, Mich., when new. The 1949 Futuramic "88" convertible coupe weighs 3845 pounds, costs $2586—although hourly wages increased eight times since the "Limited" was built

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trucks this year, accounting for roughly 23 per cent of the industry total. A V-6 overhead valve engine is a future possibility, although not conceivably much before 1951 or 1952, since it would involve major manufacturing changes and new equipment.

Chrysler—Last of the 1949 jobs has been built and a start on the succeeding series is dependent upon pushing up materials inventories to their normal balance. Tooling has been completed and calls for new rear-deck stampings, quarter panels, roofs and rear fenders, calculated to smooth out body lines at the rear and incorporate a new deck lock and license-plate framing arrangement. Output for the year aggregates approximately 133,000 units, against 98,000 in the same interval a year ago. Several designs of V-8 overhead valve engines are in the road-testing stage, and a decision on manufacturing plans should not be too far away. If the go-ahead is given, large expenditure for equipment would be required.

Dodge—This year's schedules for passenger cars have been wrapped up, with production running to around 280,000, against 193,000 last year. Truck production will continue for at least a part of this week, and some manufacturing departments which supply components for Plymouth will remain functioning. Styling changes similar to those projected for other Chrysler divisions are ready, and if steel stocks can be reinforced without too much delay, an early start may be possible although the outlook now is not promising. Planning for a completely new engine has been under way for a long period of time, with repeated quotations asked from equipment builders. The project is still hanging fire.

De Soto—Here too assemblies have been terminated, although sheet metal parts continue to move to Plymouth and Dodge Truck. Revised body lines, particularly at the rear, are in store for 1950 models, their timing hinging on the steel situation. Along with Chrysler and Dodge, this division is committed to sticking with the semiautomatic transmission and fluid coupling combination, although there has been talk of a torque-converter design being tested by Chrysler engineers. Assemblies this year have run close to 100,000, against 75,000 in the like period a year ago.

Ford—A new look at the steel picture, brightened appreciably by the return of Bethlehem Steel to production, along with changes in fabricating schedules at the Rouge mill, permitting additional tonnages to be moved to suppliers, has meant extending production of Ford cars and trucks through this month at only slightly reduced rate. The Lincoln division was to close Nov. 11, but Mercury will hold on through the month, instead of suspending Nov. 15 as had been planned originally. New Ford models will be announced Nov. 17, were shown off-the-record in Detroit Nov. 4. Appearancewise changes are not too apparent, although dozens of mechanical and engine changes will be featured. Output this year now is close to 930,000 Ford cars and trucks, 172,000 Mercurys, 32,000 Lincolns and 92,000 farm tractors, topping the total for any postwar year. Tooling is being pushed on the new torque-converter transmission, slated for availability next summer and to be made by Warner Gear at Muncie, Ind., and by Ford at Cincinnati. A new "fast-back" or "flo-line" model is ready for production on short notice.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	605,000*	516,814
November	.....	495,488
December	.....	514,337
12 mos.	.....	5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Oct. 22	143,049	123,067
Oct. 29	137,651	116,968
Nov. 5	120,924	118,229
Nov. 12	108,000	116,029

Estimates by Ward's Automotive Reports

Hudson — Production is moving ahead on the new and smaller 6-cylinder Pacemaker model (7 inches shorter wheel base) which is expected to carry a price $400-$500 less than the lowest-priced unit the company now builds. The Pacemaker is expected to compete with other makes in about the Pontiac price class. Numerous modifications have been developed for the 1950 Super and Commodore series, including d corative refinements, wider re window and a smattering of engi improvements. Assemblies this ye have passed 125,000 against 110,0 in the same months last year.

Kaiser-Frazer—Tool and die sour are of the opinion it may be diffic to have tooling completed for a ne low-priced "economy" car in tin for assembly operations by sprin even assuming proceeds from a $34 million RFC loan are received reaso ably soon, and agitation has develop in Washington for a "Senate inves gation" of the deal. Last week t K-F engine plant in Detroit suspend operations, with decision yet to reached on whether to retool for completely new smaller engine whi would appear to be a necessity f the forthcoming economy mod Already announced is a $200,0 "Walter Winchell Name-the-Car" co test, closing Jan. 15. Winchell's hig priced radio contract, incidentall will be terminated the first of t year in favor of concentration local advertising. Henry J. Kais has hit back at critics of his gover ment loans and war plant purchas by pointing out that his compani have repaid the government $188 m ion interest, as well as investing $1 million in steel, aluminum and aut building facilities. Resumption of ca building is indefinite.

Nash—Although plans had be drawn to double fourth-quarter pr duction of 1950 models over a ye ago, the situation is touch and go steel. Nash will be forced to clo Nov. 18 for lack of materials; 13,0 will be idled. The Nash plant in Ca fornia will run out of parts Dec. Nash production to Oct. 8 was 12 996.

Approximately 35,000 of the 19 automobiles have been built thus fa 63 per cent of them the small Statesman model. For the year, a semblies top 130,000, compared wi 100,000 a year ago. A prospect f spring is a still smaller and less e pensive model, perhaps with a sligh ly narrower tread and a high-cor pression, high-economy engine. E penditure of $15 million for plant a equipment is tabbed for 1950.

Oldsmobile — Alteration and ne construction work on the Lansin Mich., assembly plant should be cor pleted this week, suggesting it m be a couple of weeks more befo a good start can be made on 19 models. Schedules called for 300,0 of the 1949 versions, and 266,000 h been completed on Oct. 31. The ne General Motors "C" bodies will used on the next 98 series, with t

(*Please turn to Page* 115)

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT

Building Addition

Wigton-Abbott will add 148,000 sq ft to International Plainfield Motors

INTERNATIONAL Plainfield Motors, subsidiary of Mack Trucks Inc., will build an addition to its manufacturing plant in Plainfield, N. J.

A contract for design and construction of the one-story, 148,000-sq ft structure will incorporate the one-story, 19,200-sq ft existing facility. Wigton-Abbott Corp., engineering and contracting firm of Plainfield, N. J., was awarded the contract. The new addition will be of steel frame construction, continuous fenestration, brick spandrels and concrete plank roof with two parallel monitors running the length of the building.

Wigton-Abbott is completing three other large steel and concrete structures at the same plant. These are: A three-story assembly building and office, cafeteria and recreation facilities and a motor testing and shipping building.

Luria Buys Charles Dreifus Co.

LURIA Steel & Trading Corp., New York, bought the domestic iron and steel scrap business of Charles Dreifus Co., Philadelphia.

Walter S. Gates, long associated with Dreifus, will be Philadelphia district manager. Charles S. Schechtman will be affiliated with the Philadelphia office; Fred Gates and Stanley Amidon will serve the New England district.

Dreifus has moved its offices to the Wallace & Warner Bldg., Bryn Mawr, Pa.

Dresser Buying Magnet Cove

MAJORITY stockholders of Magnet Cove Barium Corp., Houston, accepted a proposal by Dresser Industries Inc., Cleveland, to buy the Magnet Cove common stock.

Magnet Cove's major products are mineral and chemical compounds used in preparation of drilling "mud." In rotary drilling this vital mud fluid is forced down through the drill pipe and up again between the pipe and well wall to cool the drill bit, remove cuttings and control high formation pressures encountered in drilling.

"The purchase of Magnet Cove," says H. N. Mallon, Dresser's president, "is another step in Dresser's program of long-term growth. It makes possible replacement of a significant portion of the earning of three subsidiaries sold by Dresser last January."

Dresser Industries is an affiliation of member companies, joined together by common ownership and with kindred interests, co-ordinated products and related markets. They operate chiefly in the oil, gas, water and chemical industries, producing equipment used in drilling, transporting and refining crude oil and natural gas.

Hyatt Bearings Starts Addition

HYATT BEARINGS Division of General Motors Corp., Harrison, N. J., began a 125,000-sq ft extension to its second plant in nearby Clark township.

Designs call for a modern building with steel frame masonry, an insulated roof and forced ventilation. Like the existing plant, the extension will be mainly a one-story structure with a second floor across one side as a continuation of the mezzanine arrangement.

Hyatt, a producer of roller bearings for automotive, agricultural, industrial and railroad applications, bought the second plant in 1942. Increased war demand for antifriction bearings had taxed the Harrison facility to capacity. The Clark township plant manufactures automotive roller bearings and railroad roller bearing journal boxes. The expanded plant area is expected to be occupied shortly after Jan. 1.

Knickerbocker Buys Truck-Man

TRUCK-MAN, a gasoline-powered interplant truck, is being produced by Truck-Man Division of Knickerbocker Co., Jackson, Mich.

Formerly a division of Yard-Man Inc., Truck-Man had overcrowded facilities of the parent company. Knickerbocker, the new owner, has ample facilities for producing Truck-Man in volume. Knickerbocker has been manufacturing contractor's machinery and mixers since 1883.

Owens Plant Sold to Lyon

LYON METAL Products Inc., Aurora, Ill., purchased the York, Pa., plant of Owens Yacht Co.

Lyon, which has plants in Aurora and Chicago, produces cabinets, shelving, folding furniture and show cases. The York property, one of two plants owned by Owens, will give Lyon 200,000 sq ft of space in a modern factory layout. Lyon will soon start production to serve its Atlantic seaboard customers. Increasing freight rates since 1940, more competitive facilities and an expanding dealer organization made a production plant the East necessary.

Survey Produces Results

SHELL OIL CO. had to develop shop building to handle $4 milli worth of maintenance and constr tion work each year. The compan engineers first made a survey of sh practices and materials handli methods in over 25 major industr establishments and military dep throughout the country.

What they designed at the D Park, Houston, refinery was a bui ing which incorporated such new f tures as mercury vapor and inc descent lamps to reduce eye str three traveling bridge cranes t move the length of the 98,000-sq building and an air conditioning s tem that maintains an inside te perature of 80° F.

A special cleaning building, ho ing equipment that removes dirt oil from parts brought in from refinery, insures cleanliness in main shop—an unusual feature maintenance operations. Besides assortment of machines, tools equipment needed in refinery mair nance, the shop includes offices craft foremen, a separate tool ro conference rooms, space for stor for heavy materials and locker washrooms.

EFFICIENT MATERIALS HANDLI Austin Co. which designed and the new A. B. Dick plant at Niles, accommodated materials handling other building equipment on the st ard structural framework. Trave monorail bridge in this area facilit handling of loaded tumbling ba from bath to bath in the black o finishing tanks of the plating de ment

Briefs . . .

rgs Mfg. Co.'s new Youngstown began fabricating auto body ls. Originally the plant was to e only steel stampings. The pany acquired the Carnegie-Il- s Steel Corp.'s old Upper Union for $1 million and spent $500,- remodeling and equipping it.

—o—

national Rustproof Corp., Cleve- offers a rust preventive for use luminum, chrome, and ferrous nonferrous metals. Rustarest 30, the company says, is hard and h but pliable enough to take ing or curving. The transparent ng dries without baking.

—o—

-Chalmers Mfg. Co. named Hen- & Bolthoff Co., Denver, as deal- r centrifugal pumps in Colorado Wyoming and parts of New co, Nebraska and South Dakota.

—o—

rican Radiator & Standard Sani- Corp. plant in Baltimore which spring closed because of large vitories, resumed day and night s. Company employs about 1000.

—o—

ctic Welding Alloys Corp., New , opened its new plant in Flush- N. Y., last month. Four hun- guests attended the formal ing and saw the new training l, Eutectic Welding Institute.

—o—

er & Brass Research Association me a member of the University hicago's Institute for the Study etals.

—o—

d Research Products Inc. bought building that housed the com- for the past three years in Bal- e. Plans are being drawn for vations of the interior to in- larger research laboratory fa- s, expanded manufacturing op- ons and more space for the com- 's metal finishing work. Allied s Iridite finishes.

—o—

Louis-San Francisco Railway d an order with the Ensley mill nnessee Coal, Iron & Railroad for 27,500 tons of rails for its track program. Clark Hunger- Frisco president, says the order lued at $3,110,000. He disclosed her order—for 14 modern diesel- ric locomotives—which will com- ly "dieselize" passenger service d out of Birmingham.

—o—

haefer Corp., Cedarburg, Wis., facturer of outboard motors and cycle gasoline industrial engines d its sales, service and adver- g departments for the outboard division to its Fond du Lac, Mich., plant—Kiekhaefer Aeromarine Motors Inc.

—o—

General Fireproofing Co., Youngstown, manufacturer of metal business furniture, tells how the problems of frayed nerves, wasted effort, fatigue and inefficiency are solved by its Super-Filers in a new movie. "Mechanized Record Filing" is the title of the 27-minute 16 mm film. Free showings are available.

—o—

General Electric Co. produced "Sittin' and Savin'," a color-sound slide film showing how industrial capacitors cut industrial power costs. The film is designed specifically for cost-conscious industrial plant engineers. Showings may be arranged through GE sales engineers or GE district offices.

—o—

Cleveland Corrugated Box Co. Division of General Container Corp. bought Northern Containers Inc., Cleveland. All sales and manufacturing operations of the two companies will be combined at the Cleveland Corrugated plant.

—o—

United Engineering Co.'s San Francisco plant was sold to a group of West Coast businessmen. United is a wholly owned subsidiary of Matson Navigation Co. John E. Cushing, Matson president, said United's shipbuilding facilities at Alameda, Calif., leased to Todd Shipyards, and a building in San Francisco would be retained. Property was sold when officials found that it was no longer necessary to repair their own ships.

—o—

Lapointe Machine Tool Co., Hudson, Mass., opened its new, enlarged offices in Chicago this month.

—o—

American Drill Bushing Co., Los Angeles, opened its modern new office headquarters and manufacturing plant. Growth of the company, manufacturer of American Drill Bushings, resulted in moving from three previous locations.

—o—

G. A. Gray Co., Cincinnati, builder of metal planers, planer-type milling machines and horizontal boring machines, appointed C. F. Bulotti Machinery Co., San Francisco, representative for northern California.

—o—

Binks Mfg. Co., Chicago, is offering a special one-week course on porcelain enamel spraying beginning Feb. 6, 1950. Binks, a manufacturer of spray finishing equipment, invites anyone interested in ceramic finishing to attend the course without charge.

—o—

Haynes Steel Products Co., Youngstown steel warehousing firm, is building an 80 x 300 ft addition to its No. 2 plant. It will give the company and its affiliate, Roll Form Products Co., about 80,000 sq ft of floor space.

—o—

Ohio Steel Foundry Co., Lima, O., will close its Central plant next January because of financial losses. The shutdown will throw 300 persons out of work. President John E. Galvin says the foundry operated at a loss for the last three years.

—o—

R. D. Werner Co., Greenville, Pa., is building an 80 x 250 ft addition to manufacture aluminum and magnesium products by extrusion. United Engineering & Foundry Co.'s New Castle, Pa., plant is building the extrusion equipment under plans made by Lombard Corp., Youngstown.

—o—

Monsanto Chemical Co., St. Louis, Mo., is planning construction of a $500,000 plant at Santa Clara, Calif. The new plant will manufacture synthetic resins and specialty coatings.

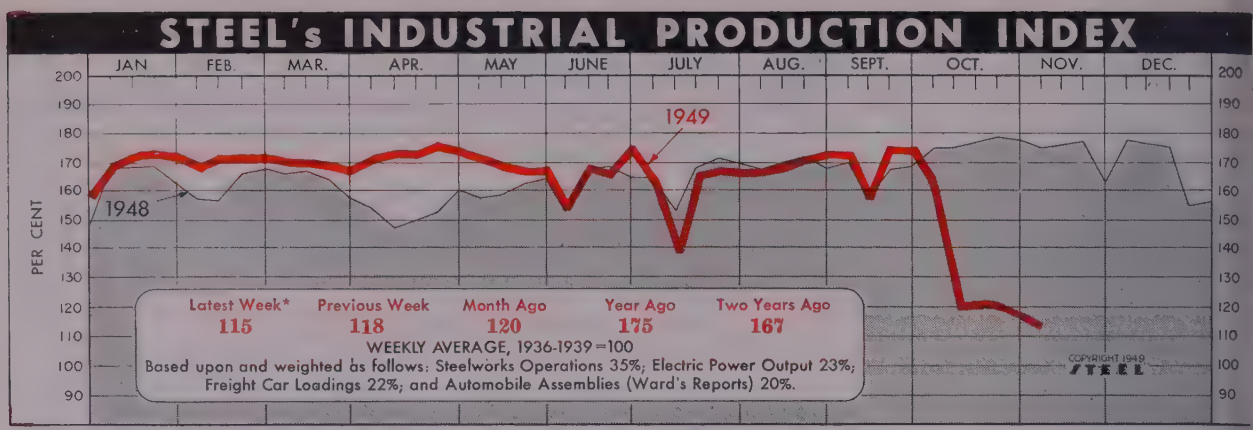
MR. SALESMAN:

You are always welcome here at Hannifin. We are pleased that you have called and are genuinely interested in hearing about your products or services. It will be to our mutual advantage if you assist us in improving our products or our methods.

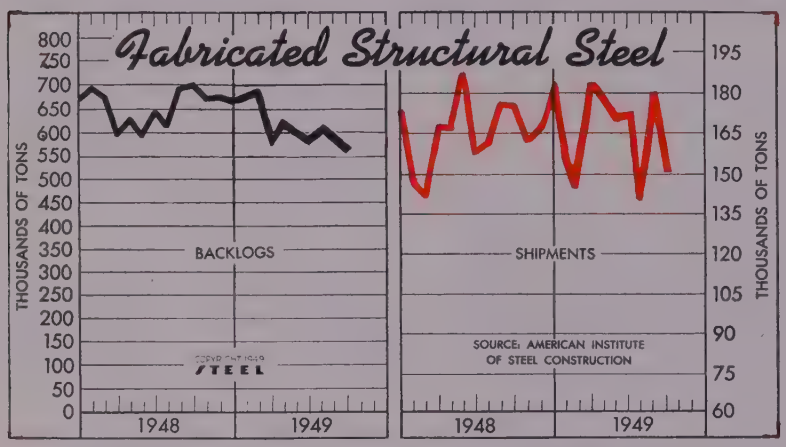
For your convenience we list the names of the men in our organization who may be most interested in meeting you.

Ellwood G. Peterson, President

FRIENDLY GREETING: Lobby of the Hannifin Corp. plant in Chicago is distinguished by this sign under which is a helpful directory for anyone who calls on business at the company. Hannifin manufactures pneumatic and hydraulic production equipment



* Week ended Nov. 5 (preliminary).

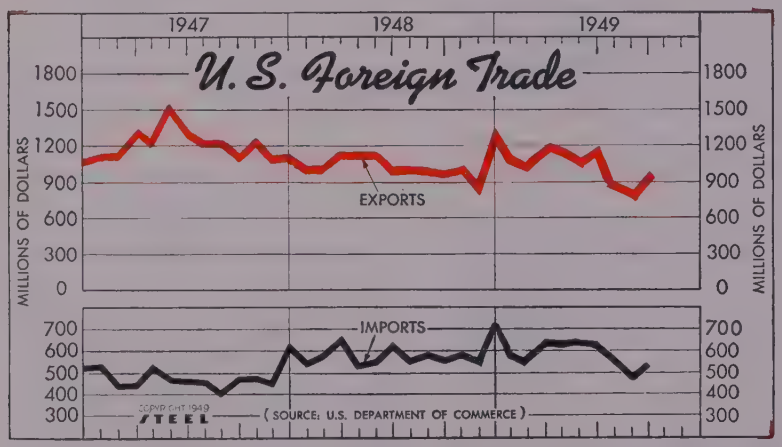


Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1949	1948	1947	1949	1948	1947
Jan.	152.7	146.4	140.6	675	692	661
Feb.	145.9	141.6	136.1	683	673	656
Mar.	185.9	167.0	137.8	582	597	614
Apr.	179.2	166.7	157.4	628	630	632
May	171.1	186.9	155.0	599	593	628
June	172.3	157.1	151.9	583	647	634
July	145.3*	160.8	169.9	605	613	661
Aug.	182.4*	176.3	158.0	583	691	639
Sept.	151.3	175.0	164.3	562	698	648
Oct.	....	164.0	196.1	...	669	649
Nov.	....	169.8	175.0	...	673	645
Dec.	....	182.4	173.0	...	670	671
Total	....	1,993.9	1,915.1			

* Revised.

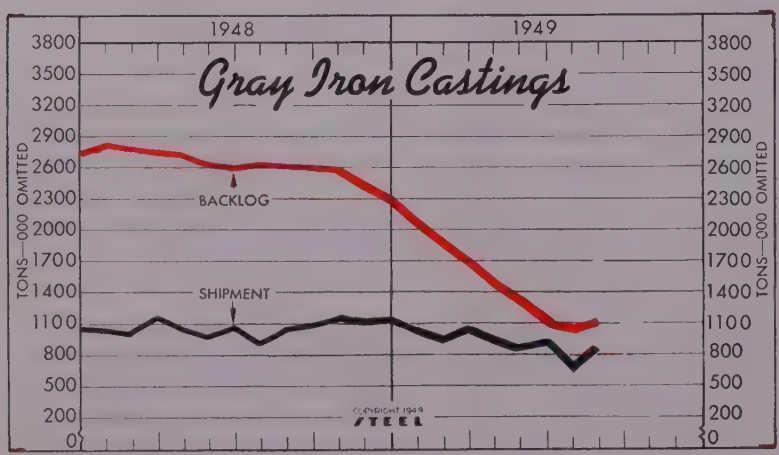


Foreign Trade

Bureau of Foreign and Domestic Commerce

(Unit Value—$1,000,000)

	Export			Import		
	1949	1948	1947	1949	1948	1947
Jan.	1,086	1,092	1,114	589	547	531
Feb.	1,029	1,086	1,146	568	585	437
Mar.	1,152	1,139	1,327	632	670	444
Apr.	1,149	1,121	1,299	534	530	512
May	1,078	1,102	1,503	541	551	474
June	1,104	1,015	1,320	527	625	463
July	897	1,019	1,265	455	563	450
Aug.	881	990	1,265	491	606	400
Sept.	904	926	1,109	531	560	481
Oct.	....	1,021	1,235	...	600	492
Nov.	....	820	1,138	...	554	454
Dec.	....	1,285	1,172	...	720	603



Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

	Shipments		Backlogs*	
	1949	1948	1949	1948
Jan.	1,040	1,064	2,065	2,80[illegible]
Feb.	987	1,024	1,857	2,76[illegible]
Mar.	1,075	1,169	1,639	2,72[illegible]
Apr.	929	1,051	1,446	2,69[illegible]
May	867	993	1,243	2,60
June	906	1,072	1,087	2,58
July	697	914	1,032	2,60
Aug.	872	1,051	1,048	2,59[illegible]
Sept.	....	1,088	....	2,58
Oct.	....	1,148	....	2,52
Nov.	....	1,100	....	2,40
Dec.	....	1,111	....	2,28[illegible]
Total	....	12,786		

* Unfilled orders for sale to the trade.

The Business Trend

JSTRIAL activity continued its downward slide e week ended Nov. 5 as STEEL's industrial pro- on index dropped 3 points to a preliminary 115 ent of the 1936—1939 average from 118 in the ding week. The 115 per cent mark, lowest since of the coal and steel strikes, followed a sharp in automobile assemblies, which offset a slight n steel production.

EL—Output of steel for ingots and castings rose 2 per cent of capacity in the week ended Nov. 5 9 per cent a week earlier. The steelmaking rate e to rise in the next few weeks as several of the n's larger producers have already signed con- s with the United Steelworkers and others are tiating agreements.

OMOBILES—As the steelmaking rate rises, au- tive assemblies are declining. In the week ended 5 the industry's outturn was 120,924 passenger and trucks, compared with 137,651 the preced- week and 118,229 in the same week in 1948. Most e decline from the preceding week's total came at sler and Ford plants, with the latter company ing changeovers to 1950 models. Automakers are hopeful that their shutdowns because of steel tages will be shorter than they feared originally. over the improved steel situation is tempered by s of what may happen in electrical suppliers' ts because of possible jurisdictional disputes re- ng from the ousting of the United Electrical kers from the CIO.

COAL—Bituminous coal output remained low at 2.8 million net tons in the week ended Oct. 29. Labor situation during the week was unchanged. Only non-union mines, those employing Progressive Miners and UMW operated mines west of the Mississippi produced any coal.

POWER—Sales of electric energy to ultimate customers aggregated 20.8 billion kwh in August, says Edison Electric Institute. This total was 2.9 per cent higher than in the same month last year.

PRICES—Wholesale prices declined 0.7 per cent in the week ended Nov. 1 to 151.4 per cent of the 1926 average. Bureau of Labor Statistics reports the latest figure is 0.6 per cent below 4 weeks ago and 7.7 per cent below the comparable week in 1948.

CONSTRUCTION—Civil engineering construction volume totaled $169.9 million in the week ended Nov. 3. This is 25 per cent above the volume for the preceding week and 55 per cent higher than in the same week in 1948. Heavy construction for the year to date totals about $6.9 billion, 17 per cent above the corresponding total a year ago.

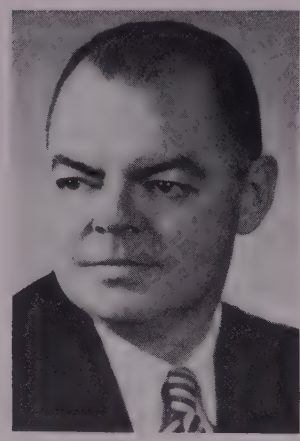
FREIGHT CARS—Domestic freight car deliveries during October totaled 4532, says the American Railway Car Institute. September production was 6141 cars. Car builders produced 2828 freight cars and 1704 were built in railroad shops. Backlog of orders on Nov. 1 was: Car builders, 7594; and railroad shops, 9783; total, 17,377. This compares with 22,203 on Oct. 1 and 111,405 a year ago.

AROMETERS of BUSINESS

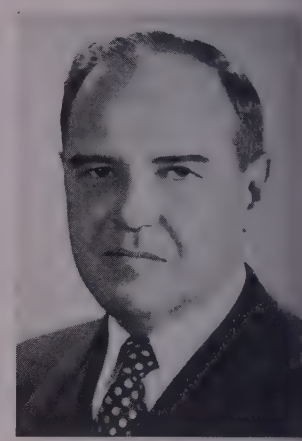
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
NDUSTRY	Steel Ingot Output (per cent of capacity)†	12.0	9.0	7.5	99.0
	Electric Power Distributed (million kilowatt hours)	5,450††	5,433	5,450	5,564
	Bituminous Coal Production (daily av.—1000 tons)	460	423	304	2,134
	Petroleum Production (daily av.—1000 bbl)	5,070††	5,075	5,015	5,650
	Construction Volume (ENR—Unit $1,000,000)	$169.9	$135.8	$152.4	$109.3
	Automobile and Truck Output (Ward's—number units)	120,924	137,651	148,443	118,229
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ††Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	583†	591	574	834
	Business Failures (Dun & Bradstreet, number)	196	221	182	104
	Money in Circulation (in millions of dollars)‡	$27,382	$27,328	$27,476	$28,254
	Department Store Sales (changes from like wk. a yr. ago)‡	—7%	—14%	—8%	—2%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,978	$13,030	$13,600	$13,076
	Federal Gross Debt (billions)	$256.9	$256.6	$256.6	$252.5
	Bond Volume, NYSE (millions)	$18.7	$17.2	$13.4	$21.3
	Stocks Sales, NYSE (thousands of shares)	7,226	7,706	6,883	9,392
	Loans and Investments (billions)†	$66.8	$66.4	$66.1	$62.4
	United States Gov't. Obligations Held (millions)†	$37,838	$37,625	$37,004	$33,526
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	170.6	168.9	172.2	227.9
	All Commodities†	151.4	152.5	152.3	164.0
	Metals and Metal Products†	168.8	169.0	169.2	172.8
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

DAVID T. MARVEL



MILO F. McCAMMON



T. W. GABRIEL

David T. Marvel has been appointed to the newly created position of general sales manager, Western Brass Mills Division, **Olin Industries Inc.,** East Alton, Ill. He served nine years as manager of sales with Tubing Specialties Division, National Tube Co., subsidiary, U. S. Steel Corp., and previously was associated for six years with Timken Steel & Tubes Division, Timken Roller Bearing Co., Canton, O., where he was manager of tubular sales in Canton. In his new capacity, Mr. Marvel will have overall responsibility for Western Brass sales operation, which includes Western's mill products division and fabricating division, the sales departments of which continue to be headed respectively by **H. M. Campbell** and **E. N. Rousseau.**

—o—

Edgard C. DeSmet has been named to the newly created post of director of body engineering for **Willys-Overland Motors Inc.,** Toledo, O. Associated with Willys 13 years, he has served successively as assistant chief engineer, chief engineer of the wartime aircraft division, and assistant to the vice president in charge of engineering.

—o—

J. C. Stites has been appointed assistant manager of sales and export sales manager of **Cleveland Twist Drill Co.,** Cleveland, succeeding the late **H. P. Jenson.** Mr. Stites, associated with the company 12 years, has been promoted from the field sales division. Formerly he was manager of the New York stockroom and service representative in Kansas City, Mo., covering the Southwest. **R. O. Artner,** formerly manager of the company's Detroit stockroom, was promoted to the field sales division.

Milo F. McCammon, identified with the automotive, aircraft and steel processing industries for almost 20 years, has been appointed general manager, Stamford Division, **Yale & Towne Mfg. Co.,** Stamford, Conn. Mr. McCammon resigned as general manager, Ingersoll Steel Division, Borg-Warner Corp., Kalamazoo, Mich., to accept Yale & Towne's appointment. He previously served as general production manager of the South Bend, Ind., division of Bendix Aviation Corp. after 12 years' association with Hudson Motor Car Co. Since last June the Stamford Division has been temporarily directed by **Otto G. Schwenk,** vice president in charge of all manufacturing operations.

—o—

Daniel J. Haughton, for the last few years assistant to the vice president in charge of manufacturing, **Lockheed Aircraft Corp.,** Burbank, Calif., has been elected to the presidencies of **Airequipment Corp.,** subsidiary of Lockheed, and **Aerol Co. Inc.,** subsidiary of Airequipment. **Burt C. Monesmith,** for the last 16 years an executive in the aircraft industry, has been appointed to succeed Mr. Haughton at Lockheed. **G. A. Fitzpatrick,** formerly superintendent of Lockheed's jet fighter production, will replace Mr. Monesmith as works manager.

—o—

Waldemar Naujoks has joined **Ladish Co.,** Cudahy, Wis., as special projects engineer. He will engage in development of ferrous and nonferrous alloy forgings. Mr. Naujoks has spent most of his business career in the hot metalworking field, and is the author of *Forging Handbook.*

T. W. Gabriel has been appoin general sales manager, **Firth St ing Steel & Carbide Corp.,** McK port, Pa. He has been sales ma ger of the Ohio district since 1 when he left Carnegie-Illinois C to join Firth Sterling. Other pointments are: **Macon Jordan,** trict sales manager, Ohio dist and **R. C. Wilkison,** carbide su visor, Detroit district.

—o—

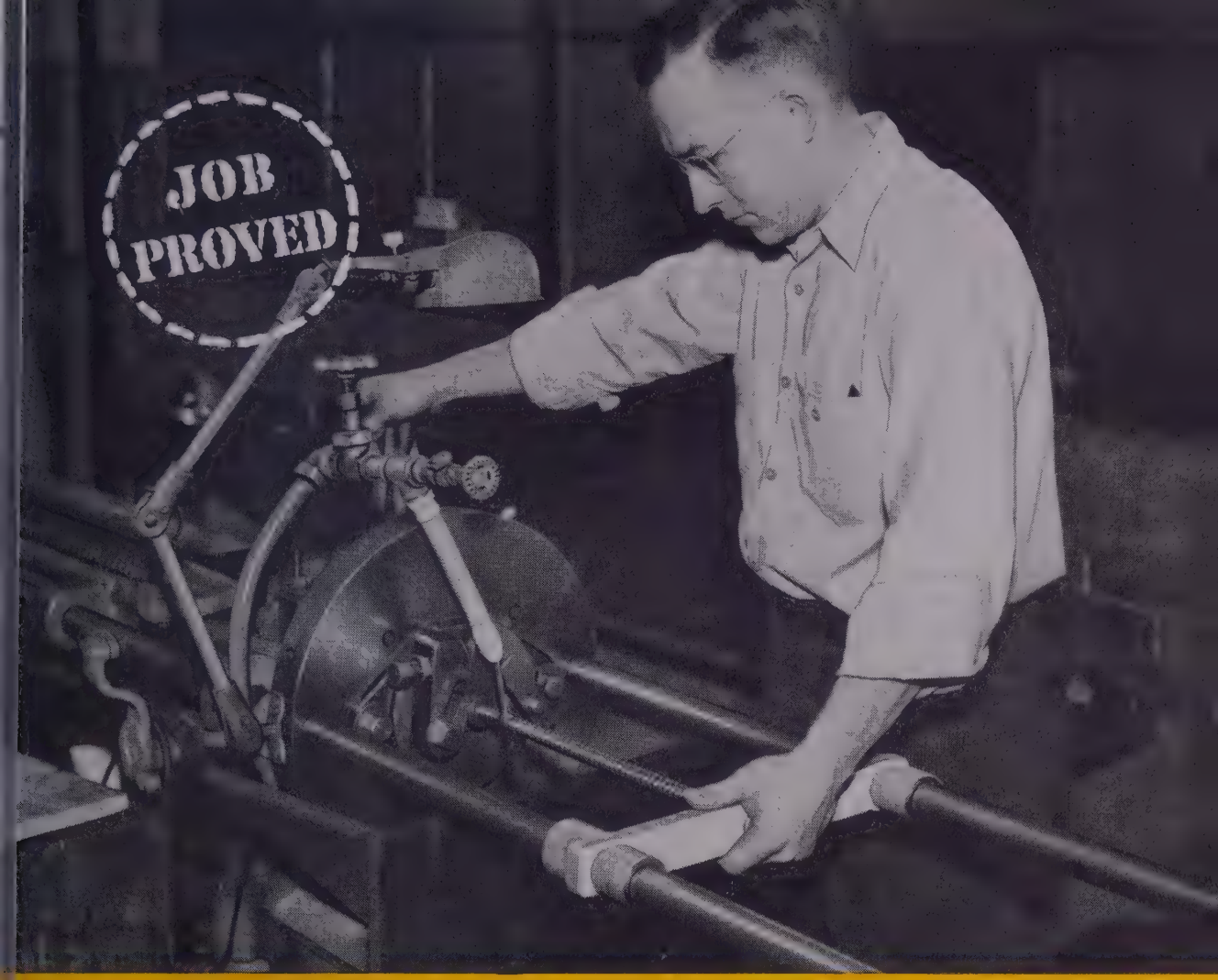
Fred Denig, vice president, **Kopp Co. Inc.,** Pittsburgh, has been m manager of the production dep ment. **Dr. G. Frank D'Alelio** s ceeds Mr. Denig as vice presid and manager of the research dep ment. The company announces th changes were brought about by resignation because of ill health **Hugh C. Minton,** vice president headed up the production departm **Dr. A. R. Powell,** assistant mana of the research department, has b made associate manager of that partment.

—o—

J. H. Goodspeed, formerly in the C cago sales office of **Titan Metal M Co.,** Bellefonte, Pa., has been pla in charge of the St. Louis sales off and will be assisted by **Miss L. Orbach** in the St. Louis metropoli area. Miss Orbach was formerl partner in Clark-Wells Metal Co., was associated with C. G. Hussey Co. in St. Louis. Mr. Goodspe territory covers Missouri, Iowa, K sas and southern Illinois.

—o—

A. O. Smith Corp. announces tr fer of the sales headquarters of welding electrode and equipment vision from Chicago to Milwaul This move brings all sales respo



TOOL LIFE INCREASED 25%

Sunicut Improves Broaching Finishes, Operators Like Its Transparency

A plant manufacturing valves was using an expensive straight animal oil for broaching. They were also adding large amounts of this product to the cutting oil used in most other machining jobs. Naturally, cutting oil costs were high.

On the advice of a Sun Engineer who had been called in, the company tried Sunicut. Good finishes resulted in all operations, completely eliminating the need for straight animal oil. Tool life increased 25 percent. Operators liked Sunicut for its transparency—it kept work visible all the time. The plant has been using Sunicut for 14 years with complete satisfaction. Two years ago, the company switched to Sunicut with Petrofac, and since then results have been even better.

Wherever operations involve tough cutting, tapping, or threading, the new grades of "Job Proved" Sunicut with Petrofac will give smooth, accurate finishes. The new grades of Sunicut possess superior metal-wetting, antiweld, and extreme pressure characteristics. They do not contain any animal or vegetable fatty oils—therefore cannot turn rancid.

For information about either Sunicut or the famous Sunoco Emulsifying Cutting Oil, call or write your nearest Sun Office.

Sunicut and Petrofac are trademarks of Sun Oil Company

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS SUNOCO®

"JOB PROVED" IN EVERY INDUSTRY

bility and direction under supervision of **J. T. Pritchard,** division manager, who has appointed **L. F. Vonier** as general sales manager of the division.

—o—

Frank M. Culpepper and **David B. Hertz,** management consultants, have opened offices at 580 Fifth Ave., New York. **Culpepper-Hertz Inc.** will specialize in quantitative research on all types of management problems, bringing to the field methods and techniques which have proved successful in the industrial research laboratory.

—o—

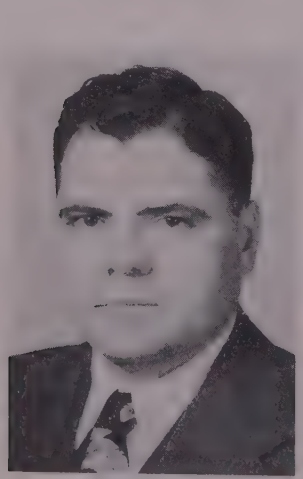
W. D. Johnson, who joined **Yates-American Machine Co.,** Beloit, Wis., in 1912, has been elected president succeeding **E. J. Dalton,** who formerly held this position jointly with that of chairman of the board. **C. H. Kelly, Victor E. Martin** and **Roger Birdsell** were elected vice presidents; **A. H. Woeckel,** secretary-treasurer; **A. B. Loft,** assistant secretary; and **F. W. Bassett,** assistant treasurer.

—o—

C. Neil Norgren, assistant general manager, **C. A. Norgren Co.,** Denver, has been elected to the board of directors of the Manufacturers' Association of Colorado.

—o—

James W. Kirkpatrick has joined **Youngstown Sheet & Tube Co.,** Youngstown, as chief metallurgist in the Youngstown district, and **Eugene M. Smith** has joined the company as flat-rolled products development engineer, located at the Campbell plant. Mr. Kirkpatrick has been assistant metallurgical engineer with H. A. Brassert Co., and had previous association with the Kearney research laboratory, Homestead district works of Carnegie-Illinois Corp., and its Pittsburgh Metallurgical Division. Mr. Smith has been with Battelle Memorial Institute in Columbus, O., where he was a research engineer.



JAMES W. KIRKPATRICK

EUGENE M. SMITH

Walter A. Vela has been named export manager, **White Motor Co.,** Cleveland, succeeding **R. L. Boughton,** retired. Since 1946 he has been associated with Graflex Inc., Rochester, N. Y., where he was export manager in charge of worldwide distribution of that company's products. He joined Sun Oil Co. in 1938, and was later made general sales manager of its South American division.

—o—

E. R. Babylon, sales metallurgist for **Kaiser Steel Corp.,** Oakland, Calif., has been transferred from Los Angeles to Oakland to promote the sale of Kaisaloy, a new lightweight, low-alloy, high-strength steel.

—o—

Nichols Wire & Aluminum Co., Davenport, Iowa, announces appointment of **Ross Crutcher** as credit manager. He was with the company from 1922 to 1940 as credit manager, resigning to join Paraffine Companies Inc., Eastern Division, as credit manager. He served in the latter position until July of this year.

—o—

G. W. Moffatt, general manager, **White Sewing Machine Products Ltd.,** Canada, has been elected a vice president of the company.

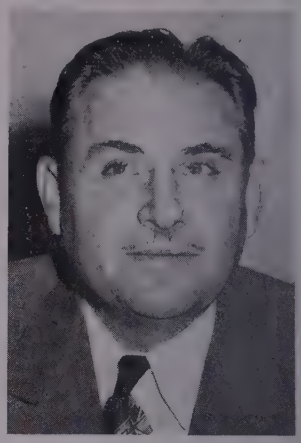
—o—

Carl T. Doman, vice president and chief engineer, **Aircooled Motors Inc.,** Syracuse, N. Y., will resign Nov. 15 to accept a post with **Ford Motor Co.** in Detroit. Mr. Doman will continue as president of Pattern Makers Inc.

—o—

John C. Pankow, director of sales, Detroit-Michigan Stove Co., has been named chairman of the **National Committee for LP-Gas Promotion,** newly organized group which will direct a broad-gage promotional program soon to be launched by the liquefied petroleum gas industry.

Carl W. Luthey has been appointe



CARL W. LUTHEY

factory manager for **Vic Pastushin Industries Inc.,** Los Angeles, manufacturer of aircraft components. Mr Luthey has served in production and administrative capacities with Douglas Aircraft Co. Inc. for the last 1 years at its El Segundo, Calif., and wartime Tulsa, Okla., plants. He previously served with Engineering Research & Equipment Co. and Technical Engineering Co., both of Los Angeles.

—o—

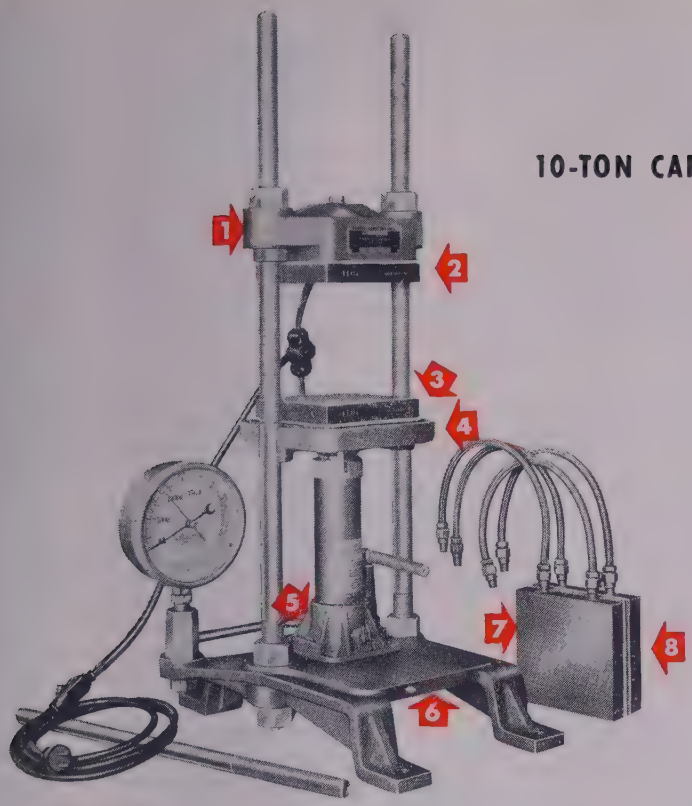
Gaetan M. Zucco, contract manage for **Bethlehem Pacific Coast Stee Corp.,** Seattle, has been promoted t full colonel as commanding office of the 498th Engineers Port Construction and Repair Headquarters, an affiliated unit of the Organized Reserve Corps sponsored by the Mountain Pacific chapter of Associate General Contractors of America.

—o—

R. W. Walker, vice president, **Mack International Motor Truck Corp.** New York, subsidiary, Mack Trucks Inc., has been named manager of its newly created eastern division, a territory representing consolidation of three of the company's major East Coast sales divisions. In his new post he will direct all Mack truck bus and fire apparatus sales and service activities through 17 direct factory branches in New York state and northern New Jersey. For the last four years he has been in charge of metropolitan New York division with headquarters at the Mack Long Island City plant, where he will continue to be located.

—o—

B. N. Barber, Chicago zone manager **Oldsmobile Division,** General Motors Corp., has been appointed Atlantic regional manager for the division with headquarters in New York. He replaces **G. H. Smith,** resigned to en



10-TON CARVER LABORATORY PRESS

1, 4, 6 Frame Parts: Head, Moving Platen, and Base.

2, 3 Electric Hot Plates for temperatures to 600°F.

5 Hydraulic Cylinder Unit Base for operation at 16,000 psi.

7, 8 Steam Hot Plates for intermittent use with steam to 200 lbs. and cold water.

Precision Equipment Demands Dependable Meehanite® Castings

FRED S. CARVER, INC., New York, N. Y., manufacturers of the Carver Laboratory Press illustrated make extensive use of Meehanite castings in the construction of their various press units. The castings are indicated, and quickly reveal the superior engineering properties which must be provided in order to meet the design specifications.

Note the hydraulic cylinder unit which is designed for repeated operations at 16,000 psi. Note also the electric hot plates which must maintain their dimensional stability after repeated submission to temperatures up to 600° F.

These units were designed for and have been built with Meehanite castings for many years, and thousands of them are giving trouble-free service all over the world. This is another example of the proper combination of good design plus the specification of Meehanite castings for better components, providing regularly the correct combination of engineering properties.

We have a Bulletin 30 entitled "Meehanite Means Better Castings" which describes a series of similar production and specification problems solved through the use of Meehanite castings. For a copy write to any of the foundries listed.

MEEHANITE FOUNDRIES

American Brake Shoe Co.	Mahwah, New Jersey
The American Laundry Machinery Co.	Rochester, New York
Atlas Foundry Co.	Detroit, Michigan
Banner Iron Works	St. Louis, Missouri
Barnett Foundry & Machine Co.	Irvington, New Jersey
H. W. Butterworth & Sons Co.	Bethayres, Pennsylvania
Continental Gin Co.	Birmingham, Alabama
The Cooper-Bessemer Corp.	Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co.	Portland, Oregon
Farrel-Birmingham Co., Inc.	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co.	Florence, New Jersey
Fulton Foundry & Machine Co., Inc.	Cleveland, Ohio
General Foundry & Manufacturing Co.	Flint, Michigan
Greenlee Foundry Co.	Chicago, Illinois
The Hamilton Foundry & Machine Co.	Hamilton, Ohio
Johnstone Foundries, Inc.	Grove City, Pennsylvania
Kanawha Manufacturing Co.	Charleston, West Virginia
Koehring Co.	Milwaukee, Wisconsin
Lincoln Foundry Corp.	Los Angeles, California
The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
Ross-Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co.	Dover, Ohio
Smith Industries, Inc.	Indianapolis, Indiana
Standard Foundry Co.	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co.	Denver, Colorado
Traylor Engineering & Mfg. Co.	Allentown, Pennsylvania
U. S. Challenge Co.	Centerville, Iowa and Batavia, Illinois
Valley Iron Works, Inc.	St. Paul, Minnesota
Vulcan Foundry Co.	Oakland, California
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey
E. Long Ltd.	Orillia, Ontario
Otis-Fensom Elevator Co., Ltd.	Hamilton, Ontario

"This advertisement sponsored by foundries listed above."

Meehanite® NEW ROCHELLE, N. Y.

ter private business. **J. E. Straud,** Milwaukee zone manager, succeeds Mr. Barber in Chicago.

—o—

A. T. Waidelich has been elected vice

A. T. WAIDELICH

president in charge of research for **Austin Co.,** Cleveland. In this capacity he will supervise the company's plant location surveys and economic and engineering reports, as well as its independent research projects. He joined Austin Co. as a structural designer in the New York district office in 1936, and has been assistant director of research at company's headquarters in Cleveland since 1941.

—o—

William D. Singleton, manager, Chester, Pa., plant of **Ford Motor Co.** since 1948, has been appointed production manager of all Ford division assembly plants, under **M. L. Wiesmyer,** manufacturing manager. **William B. Smith,** assistant manager of the Chester plant, has been named acting plant manager.

—o—

Charles E. Nail has been appointed assistant sales manager, **Shenango Tube Co.,** Sharon, Pa.

—o—

M. C. Peterson, S. E. Ragland and **M. C. Ferguson** have been appointed to the field sales organization of **Willys-Overland Motors Inc.,** Toledo, O. Mr. Peterson will have headquarters in Chicago, Mr. Ragland in Memphis, Tenn., and Mr. Ferguson in Richmond, Va.

—o—

Surface Combustion Corp., Toledo, O., announces that **Ralph W. Elmenthaler** has joined its industrial advertising staff as liaison engineer.

—o—

Dr. Walter J. Murphy, American Chemical Society editor, has been chosen to receive the 1950 gold medal of the American Institute of Chemists for his outstanding contributions to the advancement of the chemical profession. The medal will be presented to Dr. Murphy at the institute's annual meeting in New York in May.

—o—

G. Greer Coolidge, senior vice president, Harbison-Walker Refractories Co., Pittsburgh, has been elected a director of **Blaw-Knox Co.,** Pittsburgh. He fills the vacancy on the Blaw-Knox board occasioned by the death of **Donald C. Bakewell.**

—o—

Thomas Hannah Jr., associated with **American Radiator & Standard Sanitary Corp.** for the last 22 years, and manager of its Washington sales office, has been appointed manager, central business contact department, located at American-Standard's offices in Pittsburgh. **Rolland J. Hamilton** has retired as vice president of the corporation in accordance with its retirement plan, but continues to serve on the board of directors and on the executive committee.

—o—

Armand A. Hauser has been named director of sales and advertising of **Kiekhaefer Corp.,** Fond du Lac, Wis. He was assistant sales manager for three years, and joined the firm in 1943 as production department expediter.

—o—

Samuel K. Hornor has been appointed manager of sales for hardware products, and **J. F. Berger,** manager of sales for industrial wire products for the Woven Wire Fabrics Division, **John A. Roebling's Sons Co.,** Roebling, N. J. The appointments are in line with the division's new merchandising plan of complete service in two operations. Mr. Hornor has served Roebling in various sales capacities for 12 years, and Mr. Berger has been associated with the company for 35 years.

SAMUEL K. HORNOR

Following retirement of **G. L. Ring land,** chief engineer of the electrica department of the Norwood Works **Allis-Chalmers Mfg. Co.,** Milwaukee the following appointments have bee announced: **F. M. Winterhalter,** eng neer in charge of a-c design; **C. I Cobb,** engineer in charge of d-c de sign; **E. K. Spooner,** insulation eng neer; **I. C. Smith,** mechanical eng neer; and **W. T. Saveland,** assistan mechanical engineer.

—o—

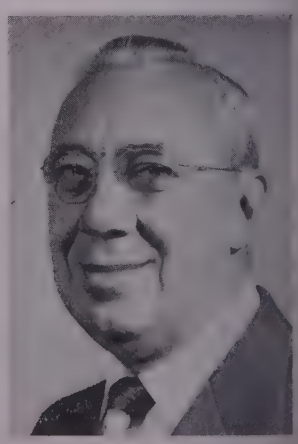
Richard Cutts Jr. has been name manager of sales for the central sta tion divisions of **General Electri Co.'s** apparatus department, Schenec tady, N. Y. He formerly was assist ant manager of sales for the G-I Meter & Instrument Divisions a Lynn, Mass., and will be succeeded b **Donald E. Craig,** manager of sale for the unit substation section, cer tral station divisions. **C. W. Bryan** assistant production manager in th apparatus department, has been ap pointed purchasing agent of G- purchasing department's Ferrou Products Division, succeeding **Areli L. Wagoner,** who will continue wor of an advisory and consulting capa ity in the division.

—o—

Taylor Instrument Cos., Rocheste N. Y., announces placement of fou salesmen, two in the Tulsa, Okla territory, one in St. Louis and on in Chicago. **Damon C. Ralph** will b stationed in Freeport, La.; **Donal F. Sullins** will cover the northwe section of Texas; **Charles H. Mill** will be stationed in Omaha, Nebr and **William Hile** will cover Indian

—o—

Riverside Metal Co., Riverside, N. J announces resignation of **Lemuel N Burhoe,** former vice president an works manager, and **J. Vincent Ha kett,** former vice president in charg of new business.



J. F. BERGER

eorge H. Wurster has been ap-inted sales representative in New igland for **Heppenstall Co.,** Pitts-rgh. He succeeds **Harold P. Jones,** tired. Mr. Wurster and Mr. Jones ve both maintained territorial sales adquarters in the company's Bos-n office. Mr. Jones was associ-ed for 32 years with Heppenstall.

—o—

omas K. Gregorius, first assistant perintendent, Creighton, Pa., works **Pittsburgh Plate Glass Co.,** ttsburgh, has been appointed su-rintendent to succeed **James Green,** tired. Mr. Green served as super-tendent since 1940, and was associ-ed with the Creighton plant for years.

—o—

ctor W. Bloomer, treasurer, **Apple-n Machine Co.,** Appleton, Wis., has en elected president to succeed the te **Henry P. Madsen. Richard adsch,** sales manager for many ars, was elected vice president in arge of sales. **Cecil Furminger,** rmer vice president, was elected easurer, succeeding Mr. Bloomer. arrie E. Morgan remains as secre-ry of the company.

—o—

inston L. Parks has been appoint-research and public relations di-ctor of **Adams Steele Inc.,** Chicago.

—o—

arshall F. Allen has been appointed anager of the **Magnesia Insulation anufacturers Association** succeeding tley W. Smith, who resigned to ac-pt a position with Ehret Magnesia fg. Co. Mr. Allen's headquarters will be at the association offices in Washington. He was formerly executive secretary of the National Aircraft Standards Committee, a subsidiary of Aircraft Industries Association. He has been engaged in trade association and government work in Washington since 1940.

—o—

James M. Arroyo has been appointed sales manager, **Martin Machine Co.,** Kewanee, Ill. He became associated with the Martin sales department several months ago to head its export sales, and for the last 15 years has been connected with domestic and export sales supervisory work.

—o—

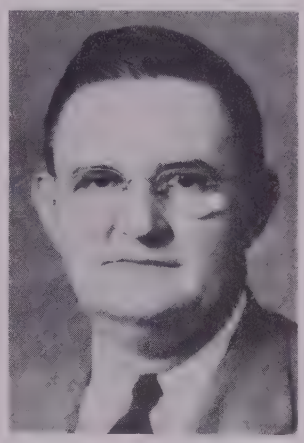
Glenn H. Edgecomb has joined the staff of **Jack & Heintz Precision Industries Inc.,** Cleveland, as works manager. He formerly was works manager of Holtzer-Cabot Electric Co., Boston, and had previously served in a similar position with Sonatone Corp., Elmsford, N. Y. During the war he was associated with Bendix Corp., Philadelphia division, where he was responsible for all manufacturing, processes, tooling and equipment. He resigned from Bendix in 1944 to join Sonatone.

—o—

William C. Bruton has been appointed district sales manager, American Manganese Steel Division, **American Brake Shoe Co.,** New York, and **Robert H. Elem** has been appointed Pacific Coast manager, welding products department. Mr. Bruton will be located at division headquarters in Oakland, Calif., and Mr. Elem in Los Angeles. Mr. Bruton will cover the Pacific Northwest.

—o—

C. J. Gerker has been appointed sales



C. J. GERKER

manager, **Midway Tool Co. Inc.,** Melvin, O. Sales offices have been established in the Arcade Bldg., Cleveland, and sales correspondence and orders will be handled from that location.

—o—

Russell G. Davis has been appointed a sales executive of **Chain Belt Co.,** Milwaukee.

—o—

Harry J. Deines has been appointed manager of advertising and sales promotion for **Westinghouse Electric Corp.,** Pittsburgh, with responsibility for staff supervision and co-ordination of all advertising and sales promotion activities. He will also maintain basic company relationships with advertising agencies.

)BITUARIES...

anley T. Goss, 68, president and under, **Goss & DeLeeuw Machine o.,** Kensington, Conn., died Oct. 31. bout 1906 he went to New Britain, onn., in the employ of Corbin Motor ehicle Corp., and later joined New ritain Machine Co., where within a w years he became a vice presi-nt in charge of the automatic screw achine and chucking machine di-sion, as well as a director. In 22, together with the late Adolph DeLeeuw, he organized Goss & eLeeuw Machine Co.

—o—

ddison Boren, 80, former treasurer, **ale & Towne Mfg. Co.,** Stamford, onn., died Nov. 3.

—o—

ristian A. Wills, 70, vice president nd general manager, **William B. Pol-ck Co.,** Youngstown, died Oct. 10 llowing a heart attack. He had en associated with the company for 45 years, and was well known for his reputation in blast furnace construction.

—o—

Henry P. Everitt, 55, assistant supervisor of employment in the Youngstown district of **Youngstown Sheet & Tube Co.,** died Nov. 4 of a heart attack.

—o—

Harris S. Currier, 57, assistant district sales manager for the Detroit office of **Inland Steel Co.,** died Nov. 2. He joined Inland in 1932.

—o—

George L. Brunner, 66, organizer of **Brunner Mfg. Co.,** Utica, N. Y., died Oct. 28 after a long illness. He organized the refrigeration equipment firm in 1907 and retired in 1946, but retained his interest in Brunner Corp. of Canada Ltd.

—o—

Francis Hodgkinson, 82, Toledo, O., mechanical engineer and inventor, who held 101 patents, principally on steam turbines, died Nov. 4. He retired as consulting mechanical engineer of **Westinghouse Electric & Mfg. Co.** in 1936 after 40 years of service for that company.

—o—

Casper Runk, 66, an operator of **Metals Disintegrating Co.** plant, Union, N. J., died Nov. 4 after an illness of several weeks.

—o—

Walter W. Landseidel, 57, chief research engineer for **Remington Rand Inc.** at Elmira, N. Y., was killed in an automobile accident Nov. 3.

—o—

Paul J. Seliskar, 34, chief standards engineer for **Parker Appliance Co.,** Cleveland, before ill health forced him into retirement two years ago, died Nov. 3.

—o—

Conrad J. Korner, 74, who established **Korner Sheet Metal Co.,** Cleveland, more than 50 years ago, died Nov. 5. He retired a year ago.

feathers or locomotives get a smoother, easier lift . . . on SKF Bearings

The SKF Spherical Roller Bearing is used on all types of cranes . . . from small hoists to locomotive or overhead cranes, some of which have capacities up to 450 tons.

That kind of versatility is a feature of the SKF line. And added to this is the ability of these quality bearings to withstand the heavy shock loads and overloads inherent in crane operation. SKF Bearings compensate for inaccuracies in fabrication and machining . . . without loss in capacity.

SKF Bearings find application in wheel and drum mountings, and are preferred by men who design the equipment. Your problems will be brought to the prompt attention of our bearing engineers. SKF Industries, Inc., Phila. 32, Pa.

6664

Crane and Hoist Bearings engineered by **SKF**

Production AND Engineering NEWS AT A GLANCE

IO HARD SPOTS— Defective and cracked castings now ıay be repaired without warping or distorting the parent ıetal by a metal-depositing process announced by Metalzing Co. of America, Chicago. The method, according to ıe company, is entirely different from any other form of dding metal in that fusion is attained without leaving hard pots. It also can be used for applying metals to misıachined surfaces, adding metal to patterns or for preparing ardened surfaces as a bond for sprayed metal.

PEEDS UP OPERATOR'S ACTIONS— Lathe machinists an lock their work into place as much as 10 times faster y employing a chuck being introduced for the first time by Vestcott Chuck Co., Oneida, N. Y. New development is reorted to combine the speed of a lever-operated chuck with ıe powerful grip of a pinion-operated unit. Versatility of he device is increased by a new mounting plate. It can e used on a milling machine dividing head for example, or an be converted into a vise or machining fixture in conection with a drill press or miller.

ARGER BRASS COILS—Scovill Mfg. Co., Waterbury, Conn., revealed at the metal show in Cleveland that it now as equipment for producing brass strip and sheet from conıuously-cast flat bars measuring 2½ x 24 inches by 10 eet long and weighing 2000 pounds or more. The material melted in large induction furnaces, continuously cast and old rolled in equipment of advanced design. Five alloys are eing commercially produced so far—70-30 cartridge brass, 5 per cent gilding metal, 90 per cent commercial bronze, 5 per cent red brass and 65 per cent yellow brass. Heavier oils mean less down-time for fabricators.

IMULTANEOUS HARDENING AND BRAZING— A cutery manufacturer has been making stainless steel knives by razing the two halves of the handle in one operation, hardning the blade in another operation and finally soldering the lade into the handle. These three operations now are perormed simultaneously in conveyor-type, atmosphere-conolled electric furnaces at the rate of 1000 pieces per hour, mploying a new nickel-copper-zinc brazing alloy in wire orm costing one-third less than the material previously used. he brazed joints are practically invisible. Developed by argeant & Wilbur Inc., Pawtucket, R. I., process is expected o have many other applications in cutting cost of fabricating teel products.

UCTILE IRON "MASS" PRODUCED— More than 40 comanies in many industries are now licensed under patents to roduce ductile cast iron developed by International Nickel Co. Inc., New York. According to Don Reese, foundry exert and engineer, who announced the Patent Office's recogition of the material before a meeting of the Gray Iron ounders' Society in Chicago, as much as 700,000 pounds of e material have been made in one day by licensees, and as uch as 200,000 pounds have been cast in one day at a single oundry. Even large castings requiring the pouring of 50,000 ounds of magnesium-treated molten metal for each casting ave been produced by employing the technique of this new evelopment.

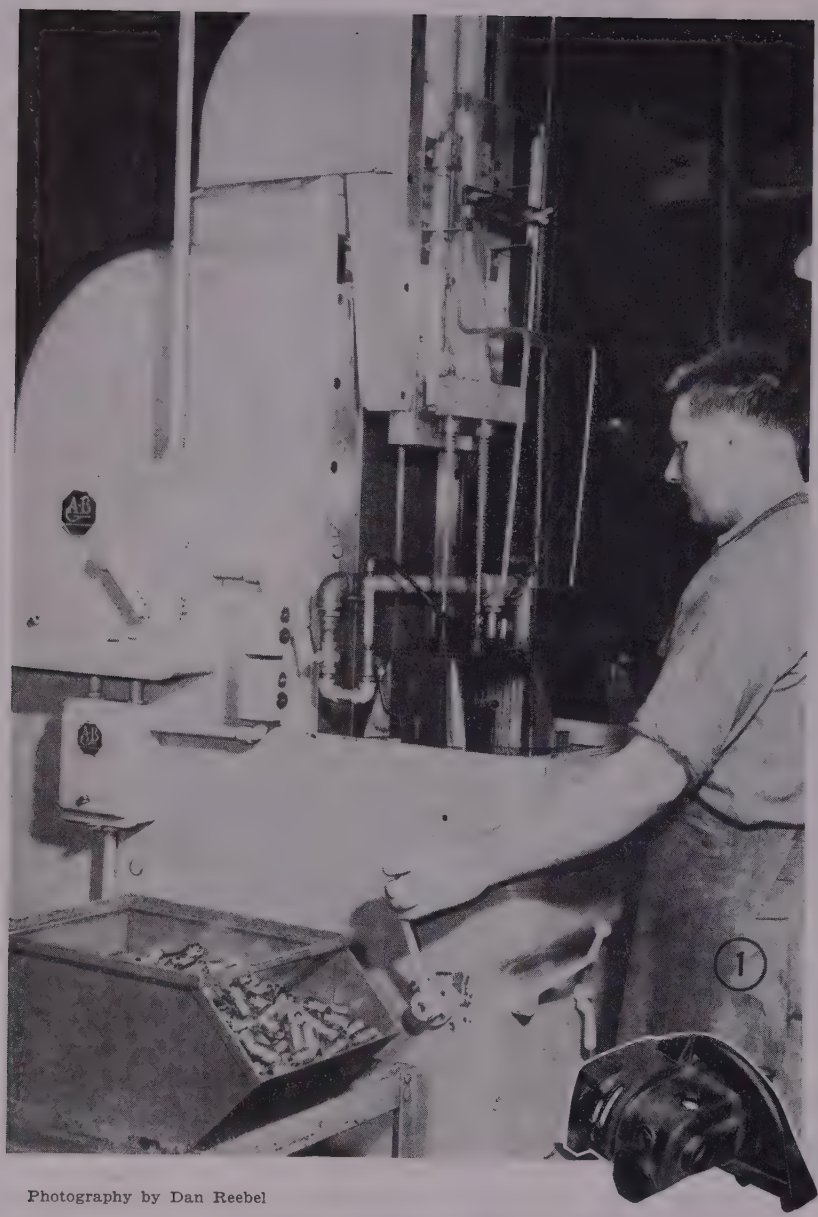
NO MANUAL HANDLING — Increased production and longer tool life are the advantages being derived by Skilsaw Inc., Chicago, in broaching worms used in portable tools. The broaching operation, which involves the cutting of eight splines in each part, is done on a 2-station machine equipped with broach retrievers. The operator never handles the broaches. This not only eliminates possibilities of broaches being dropped or nicked on hard surfaces, but also materially helps boost processing of the worms. Current production is about 400 units per hour. (p. 80)

LOW-COST JOINING—Cost of material required in making joints with a process currently used by Electric Railway Improvement Co., of Cleveland, is no more than the alloy rods used for brazed connections while that of initial equipment is negligible. Time required to actually make the joints is about one-fourth that employed in other methods. (p. 84)

CUPPING RANGE—In cupping thick steel blanks, tests performed with various dies show that the range of cupping depends to a considerable extent upon die contour. Possible diameter reduction increases either with the size of the die opening or with the average radius of the upper part of the die. It is pointed out that the tests are not sufficient to evaluate this effect definitely, although on cylindrical dies it is clearly revealed that maximum diameter reduction increases with increasing entrance radius. (p. 87)

ELIMINATING THE BUG—All high-chromium steels seem to have the peculiar property of galling or seizwhen under very high pressure. In machining, the chips tend to weld fast to the nose of the tool producing what machinists call a "bug". Real answer to this problem is to use selenium or sulphur-bearing grades of stainless. Both sulphur and selenium reduce the galling and seizing tendency to produce brittle chips making the steels extremely free-cutting. (p. 102)

ENGINEERE



Photography by Dan Reebel

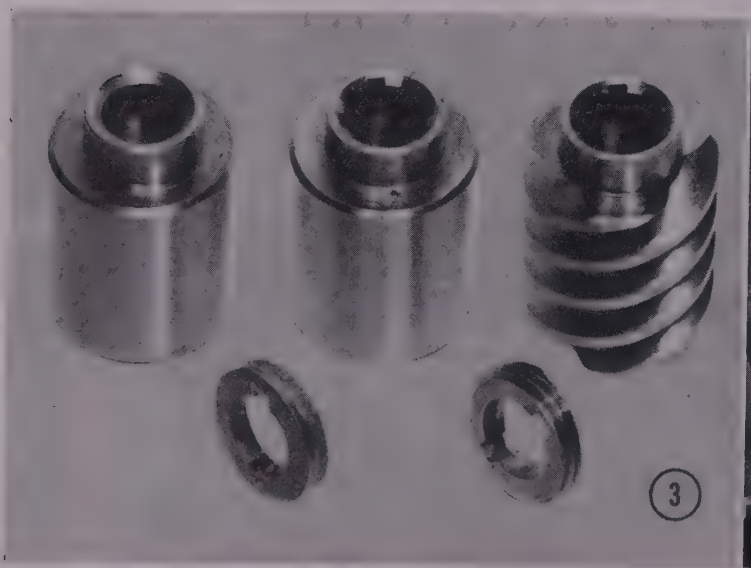
Fig. 1—Two-station vertical pull-down hydraulic broach which cuts eight splines in worm shown here. Machine has broach retrievers and plastic shield to protect operator

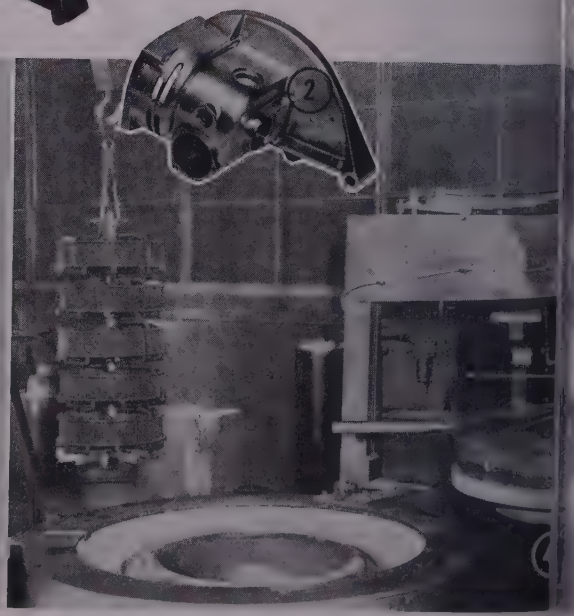
Fig. 2—Cast aluminum alloy gear chamber housings are given an attractive durable satin finish by wire brushing. Unbrushed casting is shown at left, brushed casting at right

Fig. 3—Upper row, worm for portable tools in three stages of production. Left, blank as it comes from screw machine; center, part after it is broached with eight splines; right, finished worm hobbed in one pass. Extremely close tolerances are maintained on this part. Bottom, ring screw used on portable saw

Fig. 4—Gears for drills and grinders are carburized in this controlled-atmosphere electric furnace. To prevent nicking, parts are loaded into five heat-resisting alloy baskets which are tiered up on a spindle and lowered into furnace by electric hoist

Fig. 5—View in radial saw assembly department. Shown are two assembly lines with one of two parts rack lines in center. Saw assembly carts and parts racks are kept in straight lines by steel pins sliding in steel channels embedded in the floor





By E. F. ROSS
Chicago Engineering Editor, STEEL

XPANSION

...pays off in more efficient production

How Skilsaw Inc. has modified its machining, heat treating, finishing and assembly operations to keep pace with increased volume of business is the story of careful planning based on intensive engineering and experimental work

A result of intensive engineering and experimental work pursued in the past several years, Skilsaw Inc., Chicago, manufacturer of electric and pneumatic portable tools, has added numerous new products to its line. In keeping with the resulting increased volume of business the company has found it necessary to expand its plant and manufacturing facilities at a rapid rate. Since 1938, when the first part of its present modern plant was completed, the company has built seven manufacturing additions and three warehouse units. The most recent expansion, finished and occupied within the past year, involved an expenditure of approximately half a million dollars.

Side by side with the development of new products has gone another phase of engineering which is less spectacular but most important, namely, the design of special tools, jigs and fixtures, and devising of methods for manufacture of the products. The department responsible for this work has grown considerably in recent years. During the present period of high wage rates and materials costs, the management contends that a quality product cannot be manufactured to sell at the proper price unless full advantage is taken of savings in time required to produce it. Company policy, therefore, is to use only the best and most modern tooling and manufacturing methods.

Current Practice — A few examples of current manufacturing practice will serve to illustrate how Skilsaw carries out this policy. These cover machining, heat treating, finishing and assembly operations.

One of the parts for portable tools produced by

interesting procedure is a worm approximately 1½ inches long and 1-inch diameter. This worm, shown in the upper row of Fig. 3 in three stages of production from blank to finish hobbed, is made from Stressproof steel for the purpose of eliminating heat treating and consequent possible distortion. This steel has machinability or average machining rate of approximately 125 surface feet per minute, which is about 76 per cent of AISI bessemer screw stock B-1112.

The worm blank as it comes from a Brown & Sharpe automatic screw machine is shown at the left in Fig. 3. This part has a step hole of 1/2-inch and 7/16-inch diameters. These internal diameters are drilled, bored and step reamed to 0.0005-inch tolerance. Step reamer is of a cemented carbide design to maintain the tolerance indicated. The outside diameter is box tooled to within 0.001-inch tolerance with the use of high-speed tool bits. Concentricity between bore and outside diameter is held to 0.0015-inch total indicator reading. Tolerances such as these eliminate the need for grinding operations. Machining rate is 26 pieces per hour gross.

Next operation is to broach eight splines in the American vertical pull-down broach shown in Fig. 1. This machine is hydraulic and has two stations with broach retrievers. The operator does not handle the broaches. This results in increased production and longer tool life because the broaches are not subjected to the hazard of being dropped and nicked on hard surfaces. The splines have an inside diameter of 0.438-inch, outside diameter of 0.499-inch and tolerance is 0.0005-inch. Production of the splined worm, shown in the center in Fig. 3, approaches 400 pieces per hour. To protect the operator, the machine has a plastic shield or guard which moves up and down with the retriever so as not to interfere with loading.

Hobbing—Hobbing of the worm is performed on a Barber-Colman No. 16-16 gear hobbing machine in one pass, this being possible because of modern heavy-duty equipment and tooling in use and the relatively good machinability of Stressproof. Pitch diameter runout, or eccentricity, is less than 0.0015-inch. Production is at the rate of 8 pieces per hour. This part formerly was made from SAE 4615 steel

Fig. 6—Following carburizing, gears are quenched in oil, each basket being removed from the furnace and immersed individually

which required heat treatment. The change to Stressproof has resulted in more precise worms and as pointed out previously has eliminated heat treating, thus avoiding distortion which might result from this operation. A finished worm is shown at the right in Fig. 3.

Another tool part produced in an interesting way is a ring screw used on the Skilsaw to hold a plastic window which indicates oil level in the tool. This part, shown at the bottom in Fig. 3, originally was considered for screw machine production and broaching, but was converted to punch press. It is ¾-inch diameter and is punched from 5/32-inch cold-rolled strip steel in a two station progressive die. In the first station, a 7/16-inch diameter hole with two 3/32-inch keyways is punched; in the second the ring is blanked out. These blanks are tumbled to remove die burrs after which from 20 to 30 at a time are loaded onto an arbor and threads are chased on with a die head and chasers in a turret lathe.

Heat Treating—Gears used in drills and grinders manufactured by the company are heat treated in a Leeds & Northrup Homo Carb furnace. Gears are made from SAE 8620 or 4615 steel and must be handled carefully to prevent nicking. The practice, therefore, is to load the parts by hand into shallow heat-resisting alloy baskets which are quenched with the load. This prevents the parts from tumbling together when in a heated soft stage. Each basket with its load weighs between 50 and 75 pounds and five of them are tiered up on a spindle as shown in Fig. 4. By means of an electric hoist the charge is deposited in the furnace chamber.

The heat treating cycle consists of a carburizing treatment, oil quench, reheat and draw. For the quench, baskets are withdrawn from the furnace one at a time and quenched individually, as shown in Fig. 6. By the heat treatment employed, gears attain a hardness of 40 to 45 Rockwell C and pinions a hardness of 35 to 40 Rockwell C. The parts are airless blast cleaned in an American Wheelabrator unit using fine steel grit. A charge of rubber blocks or balls is placed in the Wheelabrator along with the gears to further prevent nicking.

Satin Finish—Housings of portable tools are aluminum alloy castings which are given an attractive durable satin finish by wire brushing. This type of finish is desirable not only because it is attractive but also because the surface will not reflect lig scratch off, discolor or become tarnished. It is deriv by close control of cleaning and wire brushing o erations. Prior to brushing, the castings are wash thoroughly to remove oil. Factors which are imp tant in the brushing operation and which are k under constant control are brush wire size, spe and cleanliness. A gear chamber housing for a po able Skilsaw before and after brushing is sho in Fig. 2.

A radial saw manufactured by the company is bench-mounted unit and is assembled by ingeni methods in a department set off from other ope tions in a separate building. A view in this depa ment is shown in Fig. 5. Principal facilities h are two assembly lines 80 feet long with a parts r line of the same length paralleling each.

Assembly of a saw starts with the placing of welded sheet steel table on a welded steel assem dolly or cart mounted on steel casters. Two of th carts are shown in Fig. 5, one at the extreme ri and the other at the extreme left. One of the t parts rack lines is shown in the center. The vari saw parts are tiered up in groups on steel cast mounted conveyors or trucks supplied by Rack En neering Co.

Straight-line Flow—A feature of the assembly erations, which is on a straight-line flow on two assembly lines, is the method employed to gu assembly carts and parts racks in straight lines wh they must be moved. Inset in the concrete floor four lines on 7-foot centers and flush with the fl are Unistrut steel channels. Welded to each end the assembly carts and parts racks are short leng of steel pipe holding steel pins which drop into channels. When the pins are seated in the chann any movement of carts and racks can be in a strai line only. On the other hand, when the pins removed, assembly carts can be moved sidewise and from the line and empty parts racks can be placed with full ones.

Throughout its plant, Skilsaw has applied co dynamics developed by Pittsburgh Plate Glass This is utilized on machinery and equipment as w as the plant interior. Stratosphere gray is emplo for ceilings; suntone for the upper section and vi green for the lower section of east and west wa eye rest green for the upper section and vista gr for the lower section of north and south walls. Sto room colors are same as for the shop except that low ceiling is white. Fire fighting equipment focal red. All machinery is painted focal beige moving parts, focal yellow for handles, focal ora for electrical switches and vista green for bases the machines.

The management points out it has found increa efficiency and fewer accidents as well as impro morale among employees since the color dynam scheme was adopted. It observes that use of fo and eye-rest colors permit the worker to see job better, eye fatigue is lessened and accident h ards are reduced. Another benefit has come fr the attitude of distributors of the company's pr ucts who visit frequently. The neat, clean and tractive appearance of production facilities is pressive.

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

YEARS OF AMTDA: On Jan. 12, 1925, a group men representing 12 companies engaged in the iness of selling machine tools met in Cincinnati l organized what then was called the Associated chine Tool Dealers of America—a name since nged to American Machine Tool Distributors Asiation.

n Oct. 31, 1949, a big banquet was held at Hotel son in Cincinnati to celebrate the 25th anniversary what has grown to be a highly important link been machine tool builders and machine tool users. ce the presidency of the late George E. Merryther, whom many of us remember as one of the at and delightful characters of the machine tool ustry, AMTDA has grown from 22 to a grand l of 155 member companies from coast to coast.

he number of well known machine tool builders sent as guests at the 25th anniversary banquet sonified to me the mutual understanding which I e seen developing over the past 25 years between who build metalworking machines and men who them. In a competitive world this partnership es for a stronger America.

E MONTANUS FAMILY: Through an introduc brought about by my good friend Al G. Bryant— has the distinction of being thus far the only man has served as president both of the National Mahe Tool Builders' Association and of the American chine Tool Distributors Association—it was my at privilege to be a guest of Paul, Dick and Frank tanus at Springfield, O., on November 3.

aul Montanus, president, Springfield Machine Tool and his sons Dick and Frank, who are respectivevice president and secretary-treasurer of that comy, represent the second and third generations of amily which over a period of 63 years has kept ingfield, O., on a par with Springfield, Mass., and ingfield, Vermont, as a recognized center of mahe tool building activity.

he saga began in a little one-story building at the ner of Main and Western Avenues, when grandher Philip Edward Montanus (Paul's father)—a lesale druggist—decided to build lathes in collabion with "Uncle Billy" Lodge of Cincinnati, the ous machine tool impresario who left his impress n many southern Ohio machine tool companies, uding, of course, Lodge & Shipley.

t one time or another many noted machine tool have been connected with the Springfield Mahe Tool Co., among these being William Owen, nk Kempsmith, Adolph DeLeeuw and Edward ler. Over the entire 63-year history of the comy, however, the Montanus family has continued to he dominant force. In that period many other hine tool dynasties have risen and fallen, but this still is going strong in the third generation.

s I see it, there are two good reasons for this. is that the older Montanuses always have delead authority to the younger ones—instead of atpting to dominate them. The other is that they er have tried to drive square pegs into round s by trying to make machine tool builders out of Montanuses whose inclinations and talents lay in other directions. For instance, one of the third generation is a brain specialist—and a very good one.

The family is justly proud of the career of grandfather Philip, who in addition to founding the successful company also was one of the founders of the National Machine Tool Builders' Association, of which he served continuously as secretary from 1902 until 1909 and as vice president, 1909-10.

Respect for ancestors is a fine thing and there is a great deal of it in the machine tool industry. However, when a machine tool father has well-merited trust and respect for the engineering and manufacturing ability of his sons—as father Paul Montanus has for that of his sons Dick and Frank—that certainly does augur well for the future of a machine tool company. In my estimation, the industry as a whole could do with more of that kind of thing.

FROM MAN TO MACHINE: At the American Society of Tool Engineers' convention in Montreal on October 28, I had one of my more-or-less periodic and always interesting get-togethers with E. P. Blanchard, director of sales, Bullard Co. of Bridgeport.

This time Payse Blanchard, who was one of the speakers on economics of manufacturing, came up with an exceedingly interesting exposition of the progress of mechanization from man to machine. This he has diagramed by a simple chart shaped like an inverted capital "L" under which is an inverted parabola.

What might be called the zero of mechanization starts at the point on the vertical leg of the diagram where the parabola starts to veer away from the straight line. That is the point where primitive man made a tool consisting of a stone fastened to a stick. As the parabola departs from the vertical at an increasing angle, we come to such points as "home industries," "the job shop," "limited lot production," "quantity production," "mass production" and "automatic continuous processes".

Step-by-step the man becomes physically less important and mentally more important, until somewhere at infinity, when the parabola meets the horizontal leg of the inverted "L", the machine is everything and the man is nothing in the physical sense. We haven't got there yet, but what with the increasing cost of man power and the increasing capabilities of automatic machinery it could be that we swiftly are headed for something approaching that infinity.

WELDING COPPER TO OTHER METALS

. . . speeded-up by new process

During the last two years, applications have been worked out where connections can be made to flat and curved surfaces in both horizontal and vertical planes and in a range of wire sizes from No. 14 through 2000 MCM

By DAN REEBEL
Associate Editor, STEEL

VERSATILE equipment and method for welding copper to copper or copper to steel in which no outside source of heat is required was recently developed by Electric Railway Improvement Co., Cleveland. Known as the Cadweld process, it is similar to Thermit welding with the exception that iron oxide has been replaced by copper oxide. Reduction of copper oxide by the aluminum used in the new process yields molten copper at about 4000° F and aluminum oxide slag.

In order to handle this reduction, a combination crucible mold is machined out of graphite. The graphite, plus a mounting, frame and clamp to hold the mold together, constitutes the welder.

In actual practice, the pieces to be welded together are first placed in the mold cavity and the welder clamped shut. Next, a small steel disk is dropped in the bottom of the crucible so that it covers the tap hole leading to the mold cavity and a factory prepared cartridge of copper oxide and aluminum powder dumped into the crucible. The bottom of each cartridge contains a few grams of starting powder which can be ignited by the spark from a flint gun. The starting powder in turn sets off the exothermic reaction. The molten copper melts through the steel disk and runs down over the pieces in the mold cavity, securely welding them together. Aluminum oxide slag remaining in the welder is then cleaned out before the next weld is made.

Only limitation of the process is that it must be used only with annealed cable. Within this field, however, it will most satisfactorily meet any and standards that may be set up for a good electri connection.

Current Carrying Capacity Increased—Since t molten copper from the reaction is substantially pu copper (98 per cent by analysis) and cross sectio area of the connection is approximately 50 per ce greater than that of the cable, its current carryi capacity is substantially greater. These facts ha been borne out by laboratory tests.

A common fault of most connectors is that th corrode. This leads to arcing and ultimate failu With the new process this is impossible as eve strand is welded into a homogeneous mass of copp

Molds are designed so that the strands of the ca are sleeved well out beyond the weld. In tension t strength of the connection is limited by the streng of the annealed copper cable outside the weld. T is about 60 per cent of that of hard drawn cable.

Low Cost—Not only must the connection m certain engineering standards but it must be eco mical as well. Material required to make a connect costs no more than the alloy rods used for bra connections and the initial equipment cost is neg ible. For example, the cartridge of powder requi for a 4/0 "T" connection costs only 55 cents and allowance of five cents per weld will more than co the depreciation on the equipment.

Cleaning required is the same as that for a g brazed, soldered or mechanical connection. Time quired to actually make the connection is abou

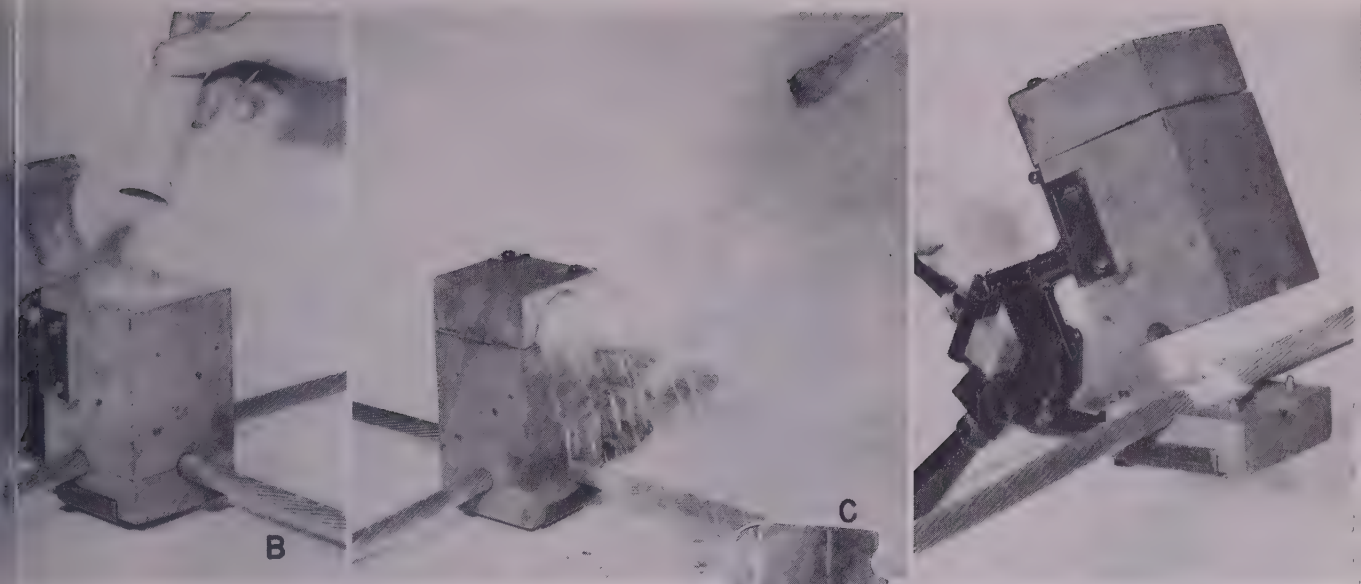
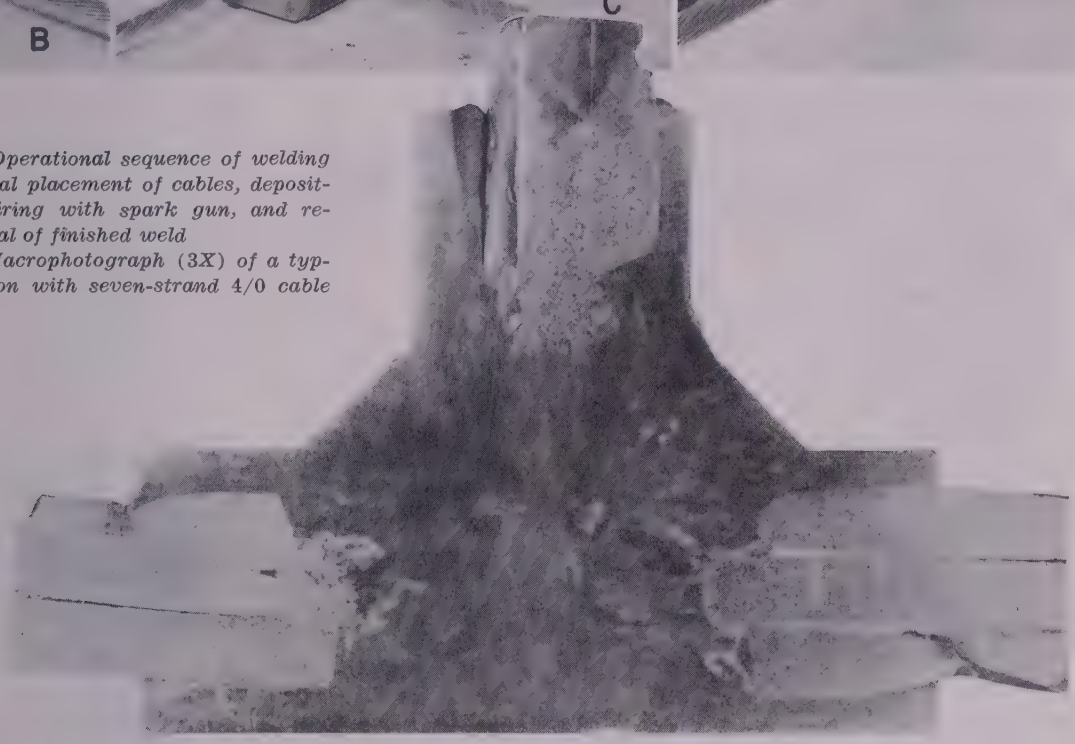


Fig. 1 (above)—Operational sequence of welding unit showing initial placement of cables, depositing of powder, firing with spark gun, and removal of finished weld

Fig. 2 (right)—Macrophotograph (3X) of a typical "T" connection with seven-strand 4/0 cable



furth of that required to make a brazed connection. No special welding skill is required and the quality of a weld can easily be checked by visual inspection. (Dirt or foreign matter produces puffy, porous welds.)

The small, lightweight equipment weighs less than 2 pounds which saves time in moving from one location to another. Often time consumed going to a job and returning costs more than the job itself.

No Danger Involved—The process is not a hazardous one, and there is no danger from gas or fumes. Operators using the equipment should take the normal precautions one would use in handling small quantities of molten metal. If the equipment is wet, it should be dried out before using, as moisture will produce porous welds and steam generated from the intense heat is apt to blow molten metal out the top of the welder.

A wet welder can be dried out preparatory to making a connection by simply plugging the mold cavity openings and igniting a cartridge of powder.

There is no danger in handling or storing the powder. Starting powder in the bottom or sealed end of the cartridge must be raised to a temperature of 800° F before it will ignite. The coarse powder, which is sometimes spilled in handling, must be raised to a temperature of 1800° F before it will react.

Probably the best indication of the safety of the process is the fact that the cartridge may be shipped without special marking or packaging.

Damage to cable insulation when making a welded, brazed, or soldered connection is largely a matter of the total heat applied. Since this is a function of temperature and time, damage done by using the process is less than with any of the relatively slower methods, even though maximum temperature is somewhat greater.

Insulation can be easily protected by simply wrapping a damp rag around the cable just outside the mold which serves to cool the outer strands while the heat from the weld is dissipated through the length of the inner strands.

Molds Are Versatile—Generally speaking, machining of the mold determines the type and size connec tion that can be made, nevertheless, the equipment i surprisingly flexible. A number of different connec tions can be made with a single mold by using a littl "horse sense" and a few short pieces of asbesto tape. Wrapping the cable with the tape before clamp ing it in the mold or wrapping tape around the cabl just outside the mold slot will prevent leaks whe smaller cable is used than that for which the mold i designed.

This process has been used to weld more than 1 million signal bonds to steel rails on many of th leading railroads in the country. During the las three years, thousands of magnesium anode lead wire have been welded to steel structures in connectio with work on cathodic protection.

Future of this type connection lies in the fiel where low resistance, high current carrying capacit and permanence are of utmost importance.

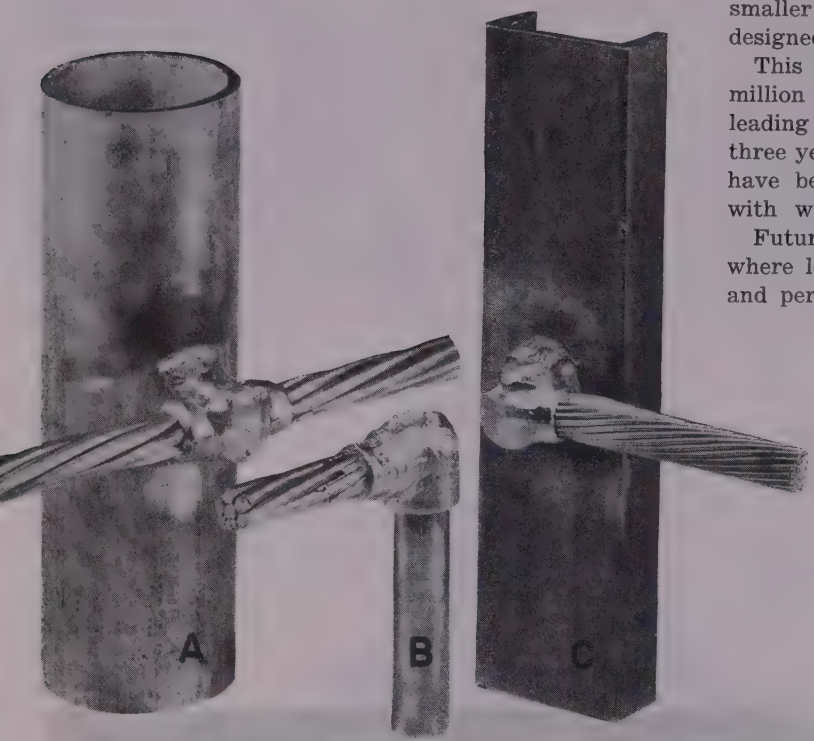
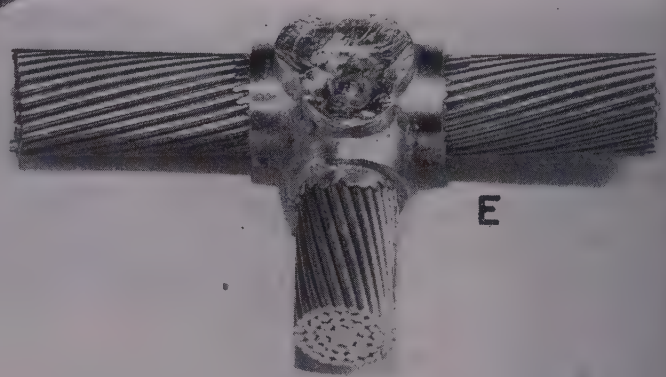
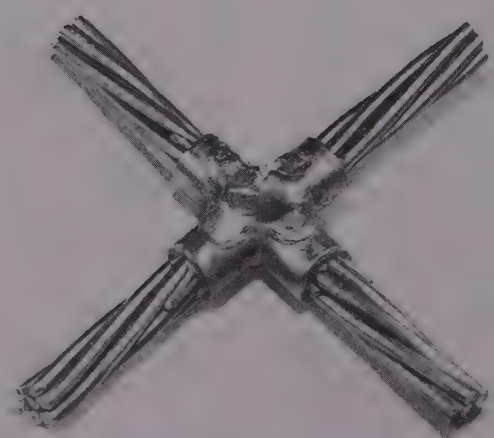
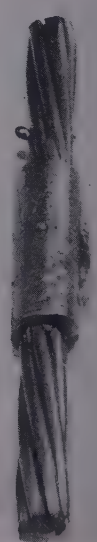


Fig. 3-A—Shows 4/0 through cable welded to a 2-inch galvanized fence post; B—4/0 cable welded to top of ¾-inch copper weld ground rod; C—4/0 cable welded to 1x2-inch steel channel; D—4/0 cable welded to flat steel surface in a horizontal position; E—"T" connection of 1000 MCM cable; F—37-strand 4/0 cable welded to a copper lug; G—Cross connection of 4/0 cable; H—Straight splice of 4/0 cable







Cupping Thick Steel Blanks

Diameter reductions below 20 per cent cannot be performed. If punch diameter is less than 50 per cent of blank diameter, bottom of cup will be punched out. Tensile failures in the wall will occur if a reduction in wall thickness of more than approximately 30 per cent is attempted and if diameter reduction is large. These and other conclusions are set forth in this second and final part of the article

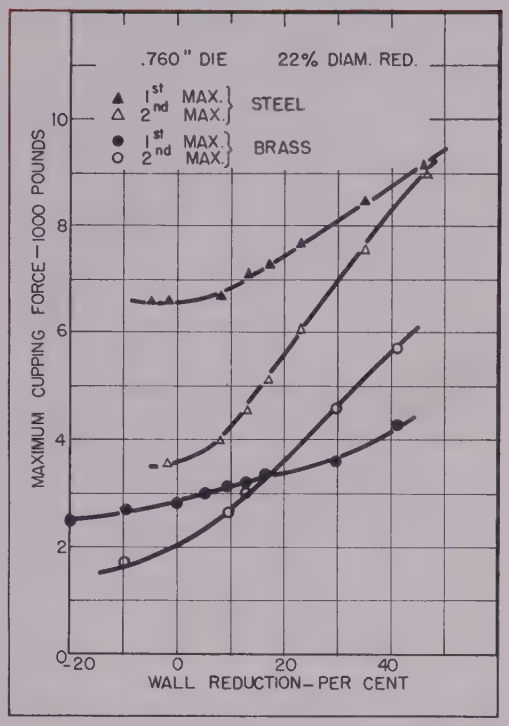
By G. SACHS, *Consulting Engineer*
G. ESPEY, *Metals Research Associates*
and J. TAUB

OR single die cupping, die contour also influences, a considerable extent, the limit of reductions in ameter and wall thickness. The diagrammatic repsentation in Fig. 8 illustrates that a limited range combinations of diameter and wall reductions reslt in shaping a cup from a blank. In addition, if e cup is expected to be even and not lopsided, the nge of reductions which will yield such a cup is rther restricted.

Defective Cups—Defective cups are of various types, ch type determining a portion of the boundary of e possible reductions in the following manner: (a) Jameter reductions less than a certain limit can t be performed because the blank will slip through e die, rather than cup. Limiting diameter reduction usually in the vicinity of 20 per cent, decreasing ghtly with increasing reduction in wall thickness.

) If the attempted wall reduction is less than apoximately 30 per cent, the bottom of the parlly folded cup will punch out if too large a diameter duction is attempted. This is readily explained ice the force required for punching out the botn should increase with the diameter of the punch. Assuming that no wall reduction occurs in the beginning of cupping and that the cupping force incases almost linearly with increasing diameter rection, the possible diameter reduction should be ighly proportional to the punch diameter. In other rds, the punch diameter must be at least 50 per t of the blank diameter in order to avoid punching t during the initial shaping of the cup.

(c) If a high wall reduction is attempted, 30 per t or higher, tensile failure occurs in the lower rt of the wall rather than a punch out. The differ-



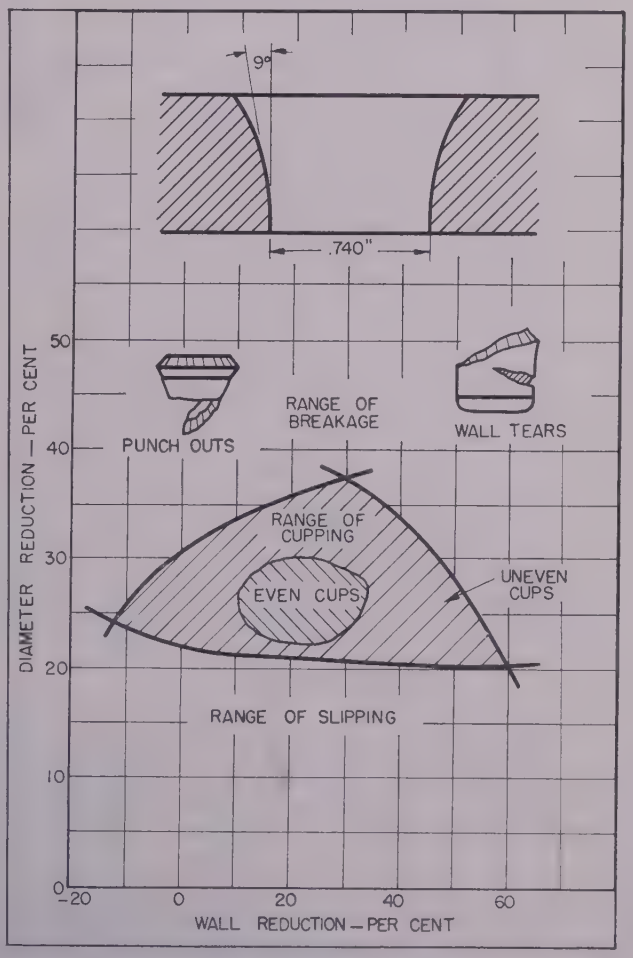
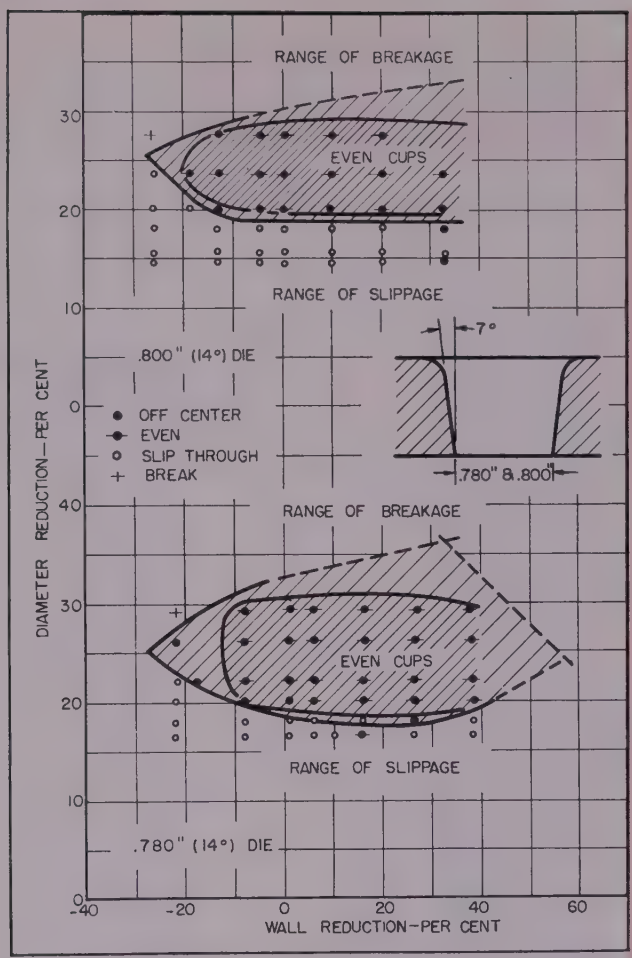


Fig. 7 (top)—Effects of reductions in wall thickness and diameter, and of metal on the maximum cupping forces

Fig. 8 (right)—Effects of reductions in wall thickness and diameter and of die contour on limits of cupping



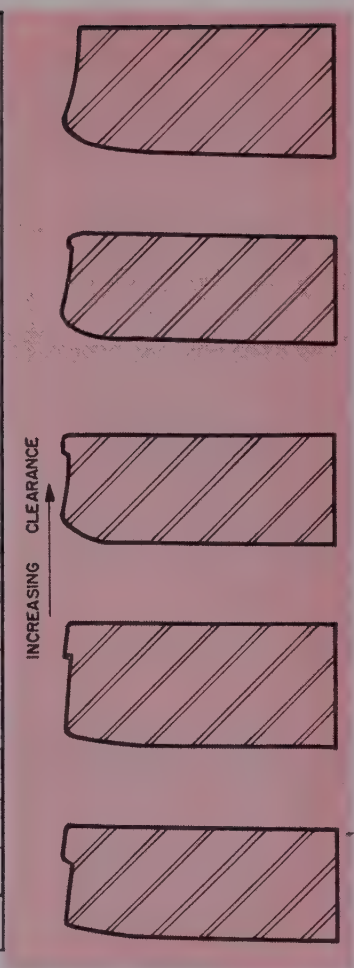
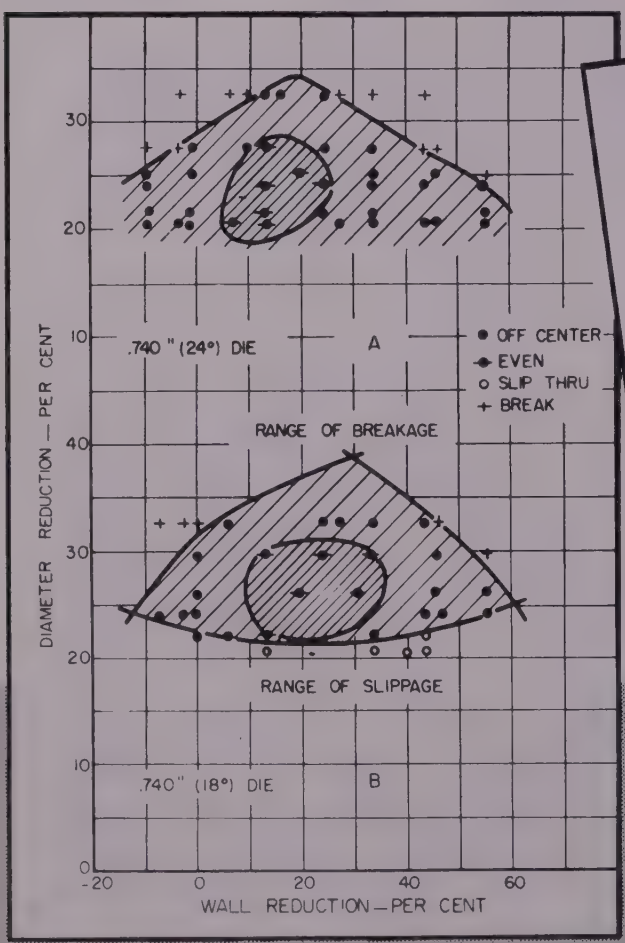


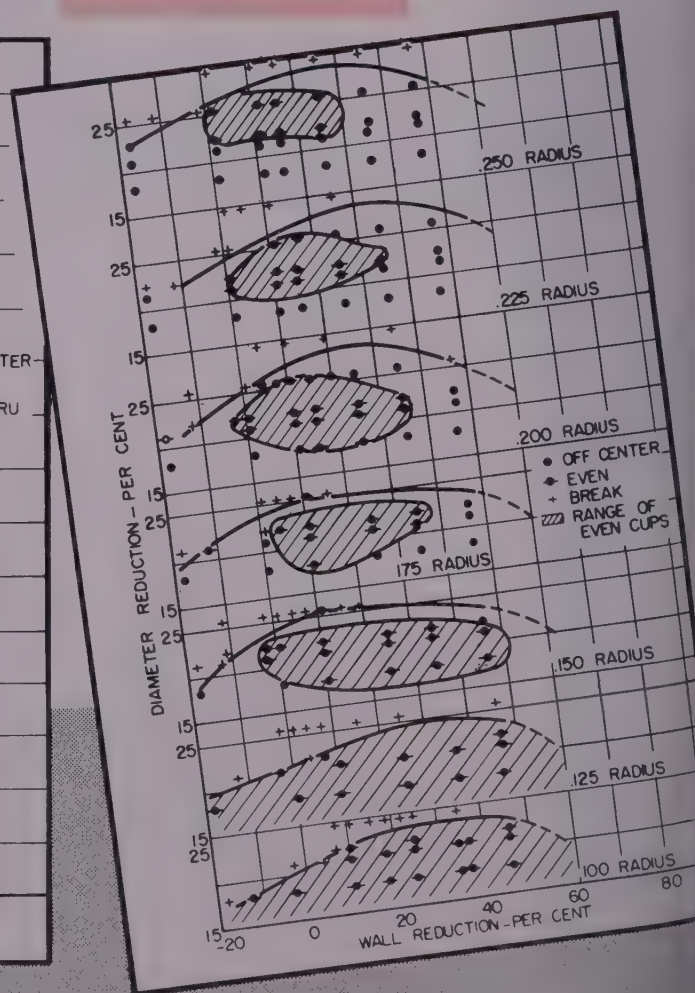
Fig. 9 (top, far lef —Effects of reductio in wall thickness a diameter and of contour on limits cupping

Fig. 10 (below, left) Effects of reduction wall thickness and ameter and of die co tour on limits of cu ping

Fig. 11 (left)—Eff of blanking clearan on sheared edge blank

Fig. 12 (below)—I fects of reductions wall thickness and ameter and radius die entrance on lim of cupping





ce between the two types of breaks is apparent om the fact that the possible reduction in diameter creases with increasing wall reduction, if the dan- r of tearing prevails. Trend of this boundary por- n of the cupping range is, without exception, such at the possible reduction in cross-sectional area m the blank rim to the cup increases with increas- reduction in wall thickness.

Thus, if it is desired to form a drawpiece in the st number of operations, or highest possible reduc- ns per operation, a cup should be formed with a luction in wall thickness close to the limit, sacri- ing reduction in diameter. The maximum values reduction in wall thickness performed in single drawing during these tests were approximately per cent. If this is considered as an ironing proc- , a single die permits a reduction in cross-sec- nal area of almost 70 per cent and this figure dis- gards the considerable thickening of the rim of oping proper. In other words, a single die having suitable contour permits a maximum reduction in ll thickness which closely agrees with that ob- ned on redrawing, or ironing.

Range of Cupping—Tests performed with various s, Figs. 9, 10 and 12 show that the range of cup- g depends to a considerable extent upon the die tour. The possible diameter reduction increases her with the size of the die opening or with the erage radius of the upper part of the die. The tests not sufficient to evaluate definitely this effect. garding cylindrical dies, it is clearly revealed that maximum diameter reduction increases with in- asing entrance radius. However, a tapered die with suitably contoured approach is superior to a radi- d cylindrical die, in this respect. Regarding the ect of taper, it is observed that a small die angle mits heavier diameter reduction than a large die gle. With increasing reduction in wall thickness, effect of the die contour decreases and practically the tested dies permitted reductions in wall thick- s of 60 per cent, if the diameter reduction was in vicinity of 20 to 25 per cent.

Evenness of Cup — As previously mentioned, one quirement regarding a cup suitable for further wing is evenness. A cup which becomes lopsided drawing is not a good cup. It not only requires re metal because of the increased scrap and earlier mming, but it also scores more easily, causes punch akage, and, in particular, the resulting cup fre- ntly has a nonuniform wall thickness which causes ficulties in the redraws.

One of the factors which considerably affects the nness of a cup is proper lining up of the tools in cupping. Three tools are involved: Blank guide, cupping die and punch guide, the relative position of which determines the evenness of the cup, and which must be perfectly lined up during the cupping operation. This problem is solved best by the use of a compound blanking and cupping die.

In the tests reported on, perfect lining up, i.e., guiding of the blank or of the punch could not be performed in all cases, because of the many sizes of blanks and punches used. Consequently, even cups were only obtained for a number of conditions for which proper guides were available. However, even under such conditions, some dies gave even cups while others produced lopsided cups. The differences in this respect were quite marked, and an attempt was made, therefore, to determine the drawing conditions conducive to even cups.

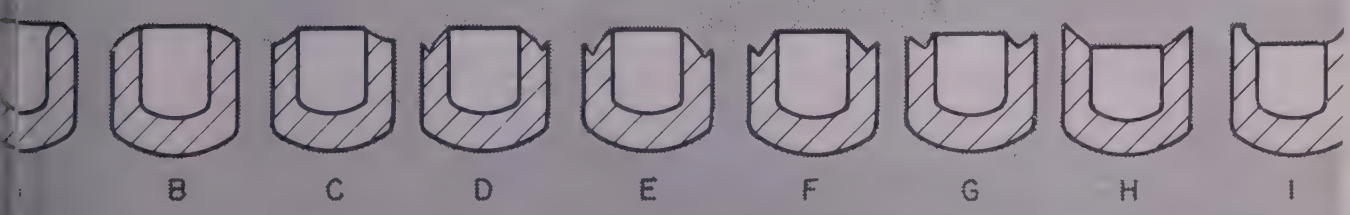
It was observed that with any die, even cups could be made only within a limited range of reductions in the center of the range of possible cupping, Fig. 8. This range of even cupping was, with some dies, very close to the total range of cupping, but with others restricted to a few combinations of reductions in diameter and in wall thickness. Center of the range of even cupping corresponds in practically all instances to a diameter reduction of approximately 25 per cent. With these reductions, all the investigated dies supplied even cups if the guiding was found to be adequate.

Also, if blanking and cupping are performed separately, the die opening should not be larger than the blank diameter. Otherwise the guiding is lost before the cupping begins. This is particularly true for blanks made with a large clearance and consequently, a tapered edge, which were found to be favorable regarding the edge of the cup.

The Opening—Regarding factors in die design which favored the evenness of the cup, it was observed, in the series of tests with radiused cylindrical dies that the tendency of the cups to become lopsided increased with increasing radius or die opening. The dies with very small radii, 0.10 and 0.125-inch gave even cups throughout the whole range of possible reductions. Unfortunately such dies are not favorable regarding the other requirements for cups. This effect of the radius at the approach is also confirmed by the results of the tests with tapered dies. Dies having a straight taper produced more even cups than dies which had a wide opening.

It appears possible to improve the guiding action and evenness of a cup by separate measures, such as the use of a blankholder or pressure pad, and the circular indenting or grooving of the bottom in combination with correspondingly shaped draw punches.

Fig. 13—Types of cup edges



However, it appears that grooving introduces or increases the danger of folds in the cartridge case head, which must be absent if proper firing is expected. On the contrary, indenting the bottom may be a possible solution, being present in forged blanks or being applied to an otherwise preformed cup as a separate bumping operation. Also, roughening the punch tip by sandblasting or grinding might improve the evenness of a cup.

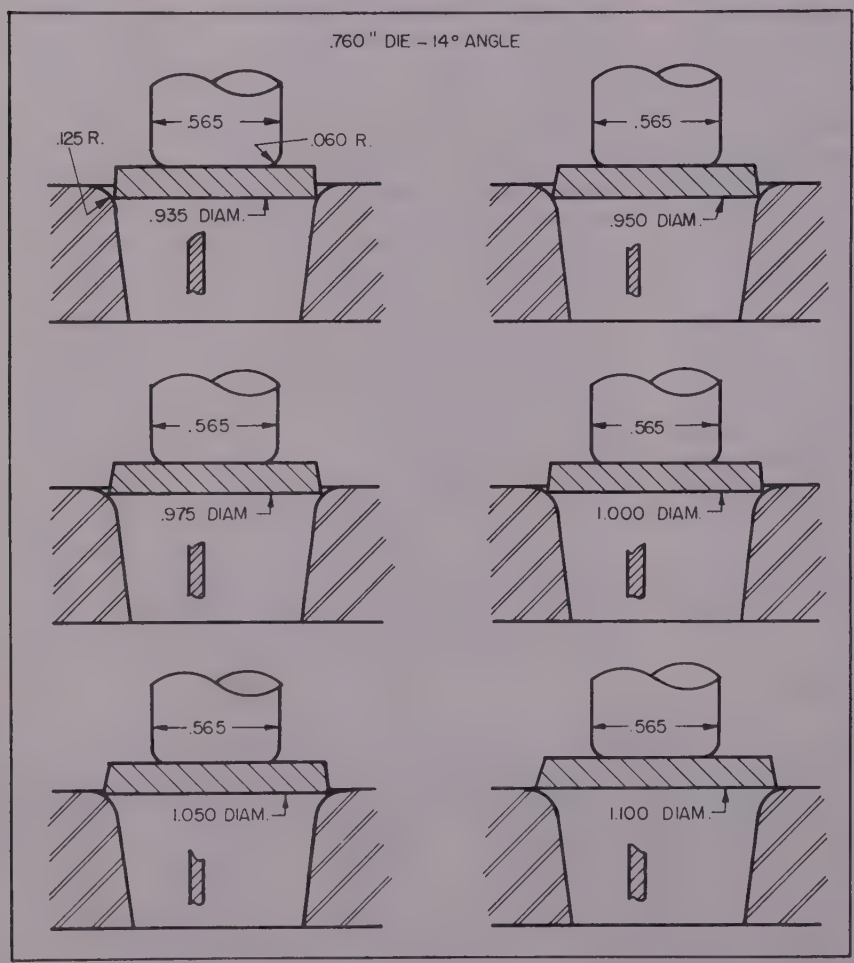
Quality of Cup Edge—Shape of the cup edge is an important feature in cartridge case drawing. In order that the greatest efficiency be attained in the subsequent drawing operations, the cup edge must possess a proper shape, Figs. 20a and b.

TABLE III

FACTORS INVOLVED IN THE FORMATION OF THE CUP EDGE
OUTSIDE SLOPING EDGE

Contact Angle Degrees	Wall Reduction %	Diameter Reduction %	Blank Clearance %	Die Diameter Inches	Punch Diameter Inches	Blank Diameter Inches
45	37	23	20	.720	.535	.935
42	51	23	20	.720	.565	.935
28	15	21	20	.740*	.490	.935
24	15	22	11	.740*	.490	.950
24	30	22	11	.740*	.490	.950
24	30	22	11	.740*	.535	.950
26	30	24	27	.740*	.535	.975
30	30	26	20	.740*	.535	1.000
27	40	24	27	.740*	.565	.975
30	40	26	20	.740*	.565	1.000
30	24	26.5	20	.685	.490	.935
31	49	..	20	.685	.535	.935
32	49	28	11	.685	.535	.950
36	59	26.5	20	.685	.565	.935
26	30	24	3.3	.740	.535	.975
30	30	26	1.3	.740	.535	1.000
30	35	27	19	.685	.490	.935
32	50	28	29	.685	.535	.950
30	30	26	20	.740	.535	1.000
26	10	24	3.3	.740	.470	.975
30	47	27	1.3	.685	.525	.935
28	30	21	20	.740	.535	.935
27	40	21	20	.740	.565	.935
25	40	22	20	.740	565	.950
Ave.						
30.5	36	25	16			

* 18° included angle (9° half die angle)



The experimentation reported h did not permit systematic variati of the many factors which are volved in cupping. Consequently, t problem was attacked in a statisti manner, by assembling the numer cup edges obtained into three tinct types, namely: (a) An outs sloping edge, Fig. 13 a, b, and c; a V-edge, Fig. 13, d, e, f, and g; an inside sloping edge, Fig. 13, h an

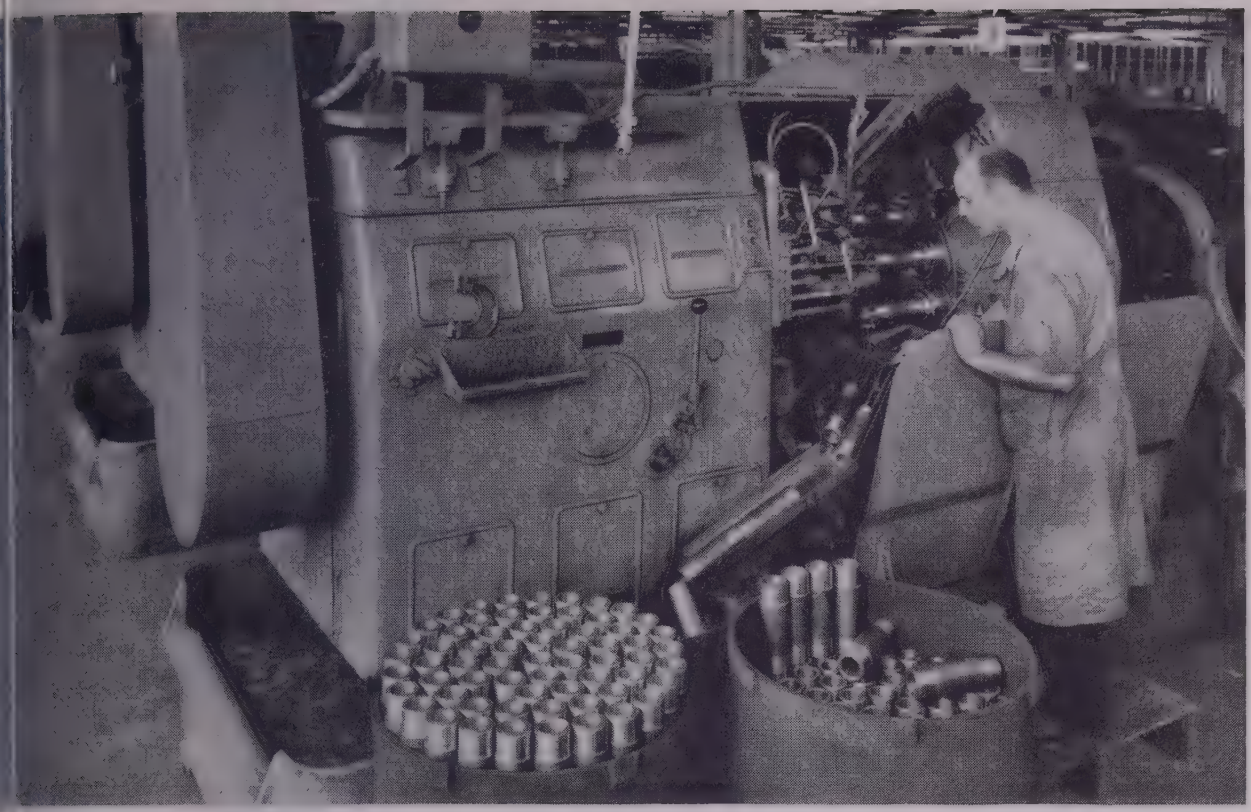
During this experimentation, only really satisfactory edge one sloping to the outside with the slightest indication of a V o burr. The V-edge always broke sooner or later, during subsequ drawing. The inside sloping e might be used if it is perfec smooth. However, some tests show for spheroidized SAE 1035 steel, t such a condition is more difficult obtain than the outside sloping ed

Types of Blanks—Before discuss the cup edges, it is necessary to scribe the various types of bla from which the cups were m Difference in blanks arises from various clearances used in the bla ing process, clearances ranging fr 1 to 37 per cent. This clearance the ratio of the difference in blanking tool diameters to the st thickness. Fig. 11 illustrates types of blank edges which were tained using various clearances. small clearance blank had an e which possessed a considerable b This burr resulted in a very rag cup edge, which is a potential sou of danger because small fragme of the edge will break off and sc the die and the cup. Since both t life and cup quality are of paramo importance in commercial fabricati such a potential danger must eliminated.

Upon increasing clearance in blanking process, the burr decrea and became less troublesome, u the point was reached where blank had a smooth taper at edge. This occurred when the bl clearance was upwards of 25 cent. Fig. 11 illustrates that all of blank edges obtained with vari clearances have an initial taper ginning on the side opposite punch, and the roughness or b begins at a distance from the b tom depending upon the clear used.

Evaluation of Results—Follow procedure was adopted in order evaluate the results of cup e studied. Dimensions and contours the various types of cupping used in this investigation were me

Fig. 14—Effects of tool dimensions and of blank size on cu edge



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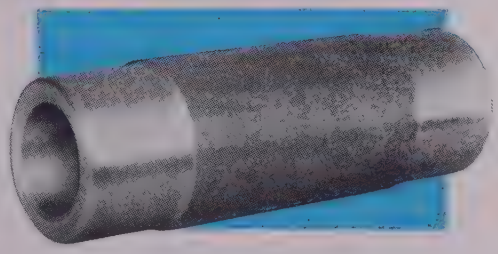
Acme-Gridley Automatics are built with basic design advantages for such low-cost performance: The rigid, box-type frame resists vibration, *holds* precision on heavy cuts. Positive, direct, quick-change camming eliminates the need for adjustments to take up wear in loose-connected linkages. It will pay you to investigate Acme-Gridley Automatics when you want the most in metal turning—more good pieces in the pan—with minimum maintenance. May we give you more information?



JOB FACTS

Part: Track Link Bushing.
Size: 2⅝" Diam. x 8" long; 7½ lbs.
Material: Steel Tubing.
Machine: Acme-Gridley 2⅝" RB-8 Spindle Automatic Bar Machine.
Performance: Battery of 4 machines operating continuously for 25,913 hours.
Production: 1,215,853 pieces.
Maintenance Charges: $683.40 total (including labor and materials).

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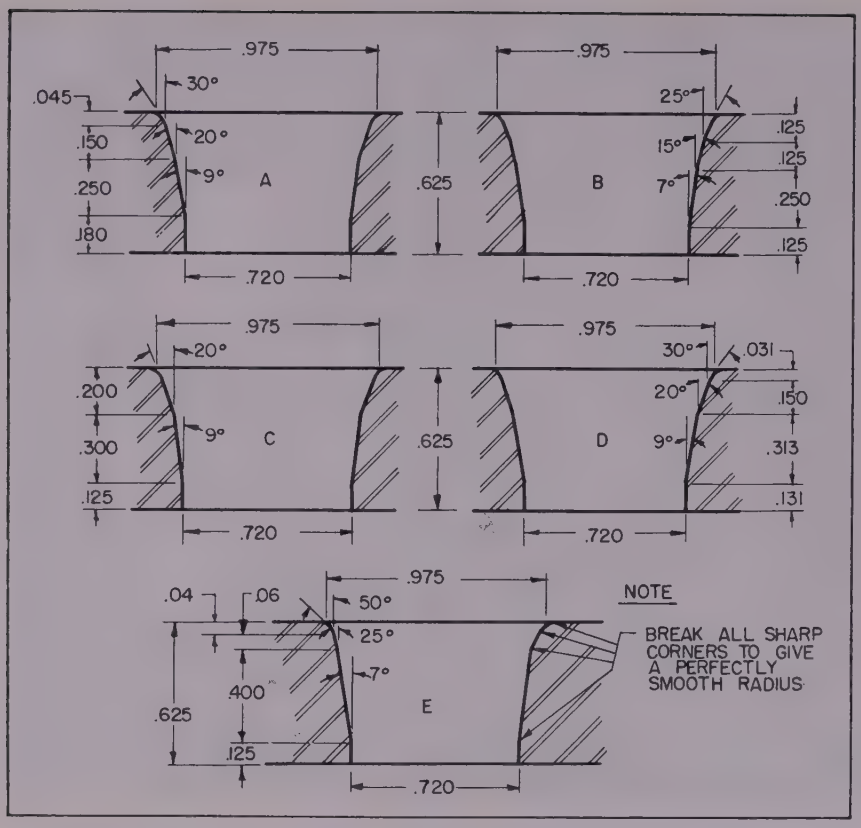

Fig. 15—Cupping dies develope for a 0.975-inch diameter blan

TABLE IV
INSIDE SLOPING EDGE

Contact Angle Degrees	Wall Reduction %	Diameter Reduction %	Blank Clearance %	Die Diameter Inches	Punch Diameter Inches	Blank Diameter Inches
65	8	28	33	.760	.490	1.05
90	8	31	37	.760	.490	1.10
66	23	28	33	.760	.535	1.05
90	23	31	37	.760	.535	1.10
68	34	28	33	.760	.565	1.05
90	34	31	37	.760	.565	1.10
38	15	30	33	.740	.490	1.05
60	15	33	37	.740	.490	1.10
37	29	36	33	.740	.535	1.00
64	29	33	37	.740	.535	1.10
36	40	30	33	.740	.565	1.00
57	40	33	37	.740	.565	1.10
90	34	35	33	.685	.490	1.05
60	30	33	37	.740	.535	1.10
90	34	31	37	.760	.565	1.10
..	34	39	20	.705	.505	1.00
60	30	33	1.3	.740	.535	1.10
38	40	30	33	.740	.565	1.05
60	22	33	1.3	.740	.505	1.10
Ave. 61	27	31	29			

TABLE V
V EDGE

Contact Angle Degrees	Wall Reduction %	Diameter Reduction %	Blank Clearance %	Die Diameter Inches	Punch Diameter Inches	Blank Diameter Inches
50	22	23	20	.720	.490	.935
55	22	24	11	.720	.490	.950
55	53	26	27	.720	.565	.975
50	8	22	27	.760	.490	.975
43	8	24	20	.760	.490	1.000
40	23	18.5	20	.760	.535	.935
43	23	20	11	.760	.535	.950
48	23	22	27	.760	.535	.975
46	23	24	20	.760	.535	1.000
40	34	20	11	.760	.565	.950
42	34	22	27	.760	.565	.975
50	34	24	20	.760	.565	1.000
90	34	31.5	20	.685	.490	1.000
62	23	23	3.3	.760	.535	.975
43	32	24	20	.760	.555	1.000
58	0	25	1.3	.820	.505	1.100
56	40	30	3.3	.685	.505	.975
47	0	18	20	.820	.505	1.000
49	0	22	33	.820	.505	1.050
58	0	25	1.3	.820	.483	1.100
47	12	18	20	.820	.555	1.000
58	27	25	1.3	.820	.600	1.100
49	5	22	33	.820	.535	1.050
49	0	22	33	.820	.505	1.050
	34	26	11	.705	.505	.950
Ave. 51.1	20.5	23	18			

ured and an accurate sketch made of the cupping tools wit blank in position for the cupping eration. Angle of contact of blank on the die opening was determined, the angle being meas between the vertical and the tan to the point of contact of the b on the die surface. A drawing of cup which was obtained from a ticular combination of die, blank punch was added so that a com picture of the cupping tools, b and cup were presented. This cedure was followed for the r types of dies and different size bl used in the investigation. The re were then assembled in Tables IV and V according to the resu edge on the cup.

From these tables, it may be cluded that each particular typ cup edge results from certain ping conditions, which are de primarily by the the three fac (a) Angle of contact between and die, (b) diameter reduction reduction in wall thickness.

Angle of contact between and die is the fundamental f regarding the cup edge. It wa served that if the angle was small, less than 25 degrees, the frequently slipped to one side would not cup. This condition be avoided because the blank sli in this manner would throw the to one side, causing it to break. favorable cup edge was obt when the angle of contact r between 25 and 35 degrees, and erably between 25 and 30 de

Most common type of cup edg countered in the investigation the V-edge. This type of edge occ when the angle of contact r between 35 and 60 degrees. This was the least desirable of the types mentioned because of the tr which occurred in the redrawin erations. Depending upon the tion of the V, either a ring or ments would break off in dr if the bottom of the V was cl the outside edge, or a cold shut be formed in the inner wall o case if the bottom of the V was to the inner wall. During f drawing the top of the case gen would break off at the cold sh

Third type of cup, having the sloping to the inside, was ob when the angle of contact rang tween 60 and 90 degrees. Alt this type of edge was not as sirable as the V edge, it cause ficulties under certain conditio the blank possessed a burr arou periphery caused by a dull bla

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It reduces material costs. Extremely close gauge tolerances mean more parts per ton (large oversize variations cut the "yield").

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TABLE VI
FACTORS DETERMINING THE TYPE OF CUP EDGE

Type of Edge	Angle of Contact	Reduction in Diameter	Reduction in Wall Thickness
Outside slope	25° to 35°	22% to 28%	Over 30%
Inside slope	Over 60°	28% to 35%	
V-Edge	All Other Combinations		

punch, it was observed that the burr was drawn into the inner wall of the cup, resulting in a cold shut in the subsequent drawing operations. If the outer wall of the cup was raised too high, subsequent drawing operations caused the top of the case to break in drawing, and score the die and case.

Angle of Contact — Reduction in diameter from the blank to the cup must be considered with the angle of contact, if the desired cup edge is to be produced. If the angle of contact is proper for either the outside or inside sloping edge, such an edge is only obtained for a restricted range of diameter reduction. This range is 22 to 28 per cent, preferably 25 per cent, for the outside sloping edge and over 28 per cent up to the possible maximum of 35 per cent for the inside sloping edge. All combinations of angle of contact and reduction in diameter except those mentioned resulted in a V-edge.

Reduction in wall thickness from blank to cup does not rate in importance with the preceding two factors, but a desired edge is obtained only when the reduction in wall thickness is also within a definite range. The outside sloping edge is favored when the reduction in wall thickness is greater than 30 per cent and preferably about 40 per cent. The large value tends to increase the slope of the edge to a greater extent than the lower values.

Inside sloping edge occurred at an average value of 27 per cent reduction in wall thickness. Table VI summarizes the important factors which determine the type of cup edge which will be produced.

Both blanks contained the volume necessary for fabricating 0.30 caliber steel cartridge cases by the three tandem die draw method, and resulted in final drawpieces with the head thickness within the desired limits of 0.155 to 0.180-inch. Some adjustment of head thickness could be made by a corresponding change of bumping depth.

Design of Cupping Dies — It is recognized that continuous curving of the working surface of the die represents the ideal shape. However, such a curve is difficult to define and to reproduce by means of a template. On the contrary, a series of tapers can readily be laid out and machined, and transformed into a continuously smooth currvature by blending the tapers. Consequently, this latter procedure has used throughout the investigation.

Of the group of dies used with the blank of 0.975-inch diameter and 0.147-inch thickness, Fig. 15, the A, B and D dies resulted in satisfactory cups. The C die caused two punches to break on two successive cupping operations. The E die with a large angle of contact (50 degrees) resulted in a cup which possessed a V edge and was not considered as acceptable for subsequent drawing.

Conditions for proper cupping of a thick (spheroidized, 3.35 per cent carbon) steel blank of heavy gage were confirmed by the experience with experimental dies, limiting the optimum condition approximately as follows:

Diameter reduction: 25 ±2 per cent. Reduction in wall thickness: 35 ±5 per cent. Angle of contact between blank and die: 25 degrees ±5. Blanking clearance: 30 ±5 per cent.

Variations of die design within these limits appear to be of minor influence on the condition of the cup. However, it appears that a die with a shorter working surface or a large average die angle is superior to a die with a long working surface or a small average die angle regarding pickup.

These data apply to a blank the thickness of which is 14 to 15 per cent of the diameter. It is possible that the conditions conducive to a perfect cup are less critical for a comparatively thinner blank.

Conclusions — Diameter reductions below 20 per cent cannot be performed because the blank will slip through the die. If the punch diameter is less than 50 per cent of the blank diameter the bottom of the cup will be punched out. Tensile failures in the wall will occur if a reduction in wall thickness of more than approximately 30 per cent is attempted and if the diameter reduction is large (over 30 per cent). With small diameter reductions, very large reductions in wall thickness can be performed.

Even edged cups can be produced only within a certain range of diameter and wall reductions, the center of the range for most dies being approximately 25 per cent reduction both in diameter and wall thickness. The range varies for different designs of the cupping die. Dies possessing a small entrance radius, 0.100 to 0.125-inch, and also a straight taper favor the production of even cups. Proper guiding of the tools must maintained to insure an even

Contour of the cup edge depe upon all factors which can be va in cupping, such as (a) quality the blank edge, (b) angle of con between blank and die, (c) re tion in diameter from blank to and (d) reduction in wall thickn The blank edge should posses smooth taper which is obtained w the total clearance between bla ing tools is more than 25 per of the blank thickness.

Angle of contact between the b surface and the surface of the approach is the most important gle factor and should be betwee and 35 degrees for the productio an outside sloping edge, and upw of 60 degrees for an inside slo edge, such edges favoring the redu ing. Two factors must be consid together in order to produce a with a good edge: The diameter duction from blank to cup and angle of contact of blank and d

For the outside sloping edge diameter reduction should be ferably 25 per cent. Inside slo edge requires the diameter redu to be approximately 30 per cent more). All other combinations o ameter reduction and angle of tact resulted in a V-edge. The re tion in wall thickness is of secon importance, but in order to a the best possible cup edge, the duction in wall thickness for the side sloping edge should be bet 35 and 40 per cent.

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Malleable Casting Manual

HUMOROUS illustrations scat throughout a 92-page manua Shock Proof malleable castings it the light touch without sacri the information about the pr Applications of the casting, tabl milling speeds, users' specifica and finishing operations are oughly covered. Available from City Malleable Co., Cleveland manual also includes informati standard malleable and high str malleable castings.

How Sid Birkland Learned about J&L Warehouse Service

J&L STEEL

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It was 2:45 P.M. on a Saturday. All the steel warehouses in town were closed, and Sid Birkland, owner and manager of the A&B Machine Works, Chicago, was in a tough spot. He needed a steel shaft, 3½ inches in diameter and a little more than 7 feet long. And he needed it *quick* for machining and installation before Monday morning. Otherwise production in a customer's plant would be stopped.

Sid had called four steel warehouses, and the only answer he got was: "Sorry, we are closed on Saturdays." Then he 'phoned Art Hoover, J&L Warehouse salesman—at home. Art, realizing the spot Sid was in, went into action.

Art called Gus Strueck, the J&L Warehouse foreman, who was about to go shopping. Together they started for the warehouse, wondering how they were going to handle the heavy bar—get it from the stock rack to the power saw. On the way, they spotted Bernie Faille, the shipping clerk, all dressed-up going to his sister's wedding. Bernie knew how to operate the crane!

. . . So, because three loyal J&L employes put a customer's needs before their own convenience, the steel shaft was ready by the time Sid's truck arrived—and on Monday morning, Sid's customer had production rolling as usual. Incidentally Bernie Faille arrived at the church in time to see his sister married.

Reenactment of a scene at J&L's Chicago Warehouse, when J&L employes, Art Hoover, (wearing hat) Bernie Faille, (in crane cab) and Gus Strueck (standing in truck) took time out on a Saturday afternoon to help A&B Machine Works out of a tight spot.

An exceptional case? Sure, but a very good example of what J&L Warehouse SERVICE can mean to you when you're in a tough spot.

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Industrial Gas Combustion with

Oxygenated Air

Economics of oxygen utilization, temperature obtainable and combustion characteristics can be demonstrated as a result of data being assembled in an AGA study of gas-air-oxygen combustion

POSSIBILITY of using oxygenated air in industrial gas combustion processes has attracted interest recently following the development of commercial oxygen at low cost. To analyze and evaluate the fields of advantageous use for this method of combustion, and to determine the present technical status and future technical needs for the gas industry in this intriguing field, the American Gas Association's committee on industrial and commercial gas research commissioned Surface Combustion Corp., Toledo, O., to make an extensive engineering study of the subject.

The report presented at the Association's thirty-first annual convention in Chicago, Oct. 17-20, by E. G. de Coriolis, director of research, and Jack Huebler, research engineer, Surface Combustion Corp., Toledo, indicates in general that low-cost oxygen ranging from 20 to 50 cents per 1000 cu ft is now or will shortly be available for commercial utilization. Purity of the oxygen, remainder being nitrogen, and equipment now available makes it possible to hold the product gas to a reasonably constant analysis.

Higher Temperatures Used—Although it is common knowledge that when air is enriched with oxygen for combustion the flame temperatures generated are generally greater, there is little concrete information available to the design engineer regarding combustion properties of utility gases using the enriched air. In recent years, Mr. de Coriolis observed, considerable interest in utilizing temperatures higher than those normally obtained in gas-air combustion has been growing in a variety of fields. Because of the efficiency limitations of ordinary air-gas combustion in the temperature ranges above 2000° F, utilization of utility gases has been in active competition with installations using electric power as a source of energy.

Continuing, he said that present interest in cheap oxygen raises the question of how the ordinary design factors are altered when the air for combustion is enriched with oxygen. Such questions arise as: What temperatures can be attained when, for example, perfect combustion is maintained with natural gas and the oxygen content of the air varied upwards to pure oxygen? How are the burning characteristics changed? What ignition and maintenance problems are involved? What refractories can be used? What means of control are possible? What elements of safety must be included? What efficiencies can be obtained? And, finally, what is the cost?

Economic Questions — Generally speaking, Mr. de Coriolis stated it can be predicted that with oxygen enrichment the flame temperatures

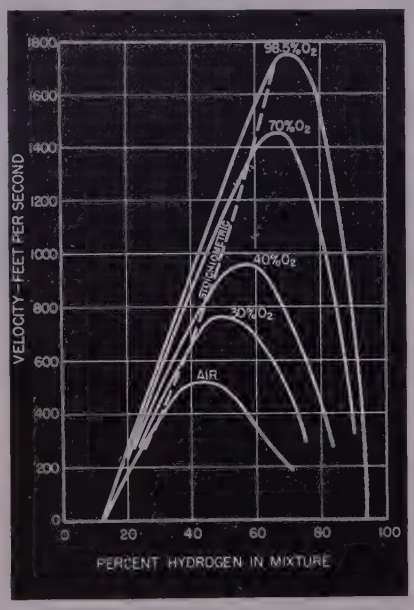

Fig. 1—Normal combustion velocities of hydrogen as a function of oxygen enrichment

that will be obtained will be hig the ignition limits wider and c bustion velocities greater, but spe information is required. From all-important economic standp the engineer must be able to an questions of the following nat With cost of natural gas at 50 c per 1000 cubic feet and cost of gen at 25 cents per 1000 cubic if a furnace temperature of 2500 is required, is it cheaper to use gen-enriched air, pure oxygen or Questions regarding cost of the nace, its desirability and other ilar factors come up and it is possible today without a great of laborious calculations to give t answers.

Furthermore, it would be im sible for most industrial gas me carry out the calculations invo without loss of a great deal of t It was the purpose, therefore, of American Gas Association's In trial and Commercial Research C mittee, in sponsoring the present search, to provide as fully as poss that information which is requ to answer the foregoing types questions and to present it in a f ion which is desirable from the st point of engineering design. A of this information is present in literature, part can be calculated f fundamental data, while the rem der will necessarily be found only experiment.

The paper which Mr. de Cori presented dealt primarily with ca lation of flame temperatures available heats for various pure industrial gases. Results were sented in only enough detail to s the scope, direction and value of work.

Reasons for Using Oxygen- variety of possible reasons exists to why it will become desirable use oxygen or oxygen-enriched to burn utility fuel gases, he poi out. Most obvious, of course, is possibility of reaching temperat above those possible with cold Use of oxygen has the advantag giving wider ignition limits and hi er combustion velocities. The gr ly reduced volume of flue products available Btu coupled with the creased burning velocities should low a far greater intensity of h release to be realized. This im tant property may be responsible far-reaching changes in indust practices. Potentialities of oxy in this connection can be reali only by experiment and are part a continuing investigation.

An additional important prop of oxygen-enriched combustion r come as a surprise to some, Mr. Coriolis asserted. Advent of I

ost oxygen makes it actually more economical to use oxygen enrichment n processes already in existence. Economics of the use of oxygen, of ourse, depend upon the operating emperature and relative costs of the uel and oxygen. A general eco-omic analysis is impossible to make ecause cost of both fuel and oxygen ary widely. Cost of manufactured nd natural gas depends upon the ection of the country. Cost of oxy-en depends upon the size of the lant, its location and the desired urity. To illustrate the use to which he calculated data may be put in his connection, certain assumptions s to cost have been made and an conomic analysis carried out.

Two oxygen costs have been as-umed to be 20 and 40 cents per 1000 ubic feet of 97 per cent pure oxy-ren. This price is believed to be ealistic since it includes operating nd maintenance costs as well as mortization of capital investment. Natural gas is assumed to cost 50 ents per thousand cubic feet and anufactured gas to cost 35 cents er thousand. Flue gas temperatures f 3000, 2500 and 2000° F have been ssumed.

Calculation Method—Assuming nat-ral gas to cost 50 cents, oxygen cost 20 cents, flue gas temperature be 3000° F, and oxygen-air mix-ure to be such as to yield 50 per ent oxygen, and referring to tables at have been prepared, it is shown at available heat is 528 Btu per ubic foot and that perfect combus-on will require 1.595 cu ft of oxy-en per cubic foot of gas. Therefore, r each 100,000 Btu of heat required, 00,000 divided by 528, or 189 cu ft

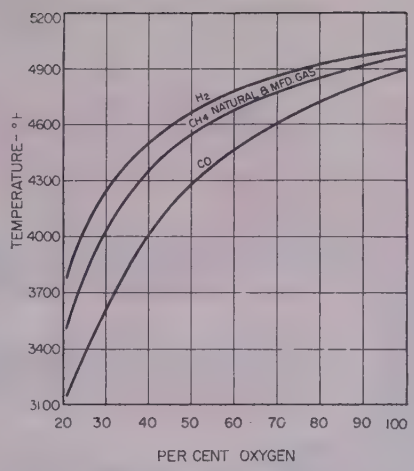

Fig. 2—Theoretical flame temperature as a function of per cent oxygen

of gas must be burned. The oxygen requirement will be 189 or 1.595, or 302 cubic feet. Gas cost, therefore, is 0.189 x 50, or 9.45 cents, and oxygen cost is 0.302 x 20, or 6.04 cents. Thus, total cost becomes 15.49 cents per 100,000 Btu of useful heat. Enough of these calculations have been made to plot curves.

These curves show that an economic advantage may be obtained by use of oxygen at fairly low temperatures; temperatures well within present-day operating limits. For example, with either natural or manufactured gas and 20-cent oxygen a substantial saving is made at 2500° F. As a practical example of the scope of these savings one might consider a furnace design to heat rapidly steel blanks for forging. A typical furnace of this type might operate with a flue gas temperature of 3000° F and an available heat demand of 4 million Btu per hour. From the proper curve it will be found that the cost per hour using air is $10.50, using 40 per cent oxygen is $6.50, and using 97 per cent oxygen is $5.70. If technical reasons do not prevent use of oxygen, savings of over $100 a day may be realized with 20-cent oxygen on this single furnace.

Other Problems—In concluding his presentation, Mr. de Coriolis said that although it will be possible as a result of the data being assembled in the study of gas-air-oxygen combustion to demonstrate the economics of oxygen utilization, temperatures obtainable, and combustion characteristics, there are a number of equally important problems to be solved. New burners will be required. Simple means for controlling the triple mixture of gas, air and oxygen must be developed. Furnace construction may be altered in regard to size, shape and burner placement. New safety procedures may be required. New ceramics will be required. In spite of the widespread work being done on refractories, the need for specific ceramic developments pointed toward this field is indicated. An additional associated problem is the influence of oxygen enrichment upon the noise generated during combustion.

It is not probable, the speaker added, that solution of these problems will be immediately forthcoming, but the purpose of his presentation was to indicate the course ahead, based on a thorough study of presently known technical and nontechnical facts.

lant Maintenance Show

VER 100 exhibitors will give dem-istrations of machinery, materials d methods for the reduction of cost plant maintenance at the plant aintenance show to be held in eveland, January 16 to 19, 1950. e American Society of Mechanical ngineers and the Society for the dvancement of Management will be -sponsors of the conference program hich will be held concurrently with e show.

The first exposition and conference er devoted exclusively to the effi-nt maintenance of plant, it will ver a wide variety of topics of in-rest to management. Topics sched-d for discussion include: Main-nance organization and manage-nt, budgeting the maintenance eration, selection and upkeep of hting equipment, upkeep of mo-rs, controls and distribution equipment, using electrical instruments in maintenance, upkeep of floors, roofs and walls, lubrication and application of service equipment.

The Story of Zinc

TRACING the story of zinc from the mining of the crude ore to the gleaming blue-white slabs at the end of the complex production process is a 34-minute sound motion picture, sponsored by St. Joseph Lead Co. in co-operation with United Bureau of Mines and produced by Atlas Film Corp., Oak Park, Ill. At the site of a large zinc mine in New York State, it shows men mining the ore in caverns one-half mile under the surface of the earth.

Animated diagrams help explain the complex processes through which the ore passes in the preparation of metallic zinc and zinc oxide. Molten zinc is shown pouring from ladles that hold more than 1400 pounds apiece. Entitled, "Zinc—Its Mining, Milling and Smelting," the film is available to schools, colleges, scientific and technical societies and other groups through the film library of the United States Bureau of Mines, Pittsburgh.

Wall Forms Made of Magnesium

DESIGNED to take advantage of the desirable chemical and physical properties of the metal are magnesium wall forms manufactured by Symons Clamp & Mfg. Co., Chicago. Light weight of the magnesium, supplied by Dow Chemical Co. of Midland Mich., makes the form easily portable, the panels weighing less than 3 pounds per square foot. Use of 3/16-inch plate produces high rigidity to insure a smooth-surfaced wall with no waves or dents. The material also possesses a high degree of resistance to corrosion by the alkalies in concrete.

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T STEP The used 's blotter has been Result—no data to r reordering. The ng engineer takes heel for analysis.

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FUNDAMENTALS of STEELMAKING

NUMBER 15 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Presented herewith are descriptions of the various types of stainless steel together with a discussion of their physical properties, fabrication considerations and indicated uses

Production of STAINLESS STEEL

By B. H. DeLONG
Vice President and Technical Director
Carpenter Steel Co.
Reading, Pa.

PART III

EACH of the various types of stainless steel serves a definite purpose and differs from any of the others. The chrome-nickel types will be discussed first.

Type 302 is the typical general purpose "18-8" stainless steel. It contains an average of 18 per cent chrome, 8 per cent nickel and 0.08 to 0.15 per cent carbon. This analysis represents the workable minimum amount of chromium and nickel consistent with good corrosion resistance and stability of structure in manufacture and fabrication. There are hardly any steels which will show in the annealed condition the great amount of toughness exhibited by the chrome-nickel stainless steels as represented by type 302 which shows the following physical properties as compared with type 410, a straight 13 per cent chromium stainless steel discussed in more detail later.[5]

	Type 302	Type
Tensile strength psi	90,000	75,00
Yield strength 0.2 per cent off set psi	35,000	40,00
Per cent elongation	60	30
Per cent reduction of area	70	75
Izod impact, ft-lbs.	110	90
Brinell hardness	150	150

Fig. 12—Lathe chips illustrating the effect of selenium or sulphur on the machinability of chrome-nickel stainless steel. Continuous chip on left shows tough nature of type 304. Pile of small chips on right indicates free-machinability obtained by the addition of selenium

Type 304 is very similar to type 302 excepting th it contains 0.08 per cent maximum carbon instead 0.08 to 0.15 per cent. This lowering of the carb increases corrosion resistance to some extent but t greatest asset is the lessened sensitivity to deterior tion during welding. When chrome-nickel austeni stainless steels, such as type 302 are heated to te peratures around 800 to 1500° F corrosion properti are materially decreased and physical properties a also somewhat impaired. This is due to a precipit tion of chromium carbide at the grain of the me (as previously discussed) with the result that t metal at the grain boundaries loses its chromium a consequently loses its corrosion properties. Recog tion of this phenomenon is of importance in weld structures because there will always be certain are adjacent to the weld metal which will have to heated within the range of 800 to 1500° F and if p into service in this condition, preferred attack w take place in these areas. To avoid this without loying, it is necessary to reanneal the whole structu and this is done by heating to 1900 to 2100°F a quenching in water. This treatment puts the chro carbides back in solution again. The Strauss t which evaluates this precipitation was previously d cussed under corrosion.

To completely avoid this intergranular attack lumbium or titanium is added to the alloy. Type 3 is the columbium bearing and type 321 the titani bearing grade. Function of the titanium and colu bium is to effectively combine with the carbon in steel; this is accomplished because both titani and columbium have a very strong affinity for carb The result is that it is then no longer possible

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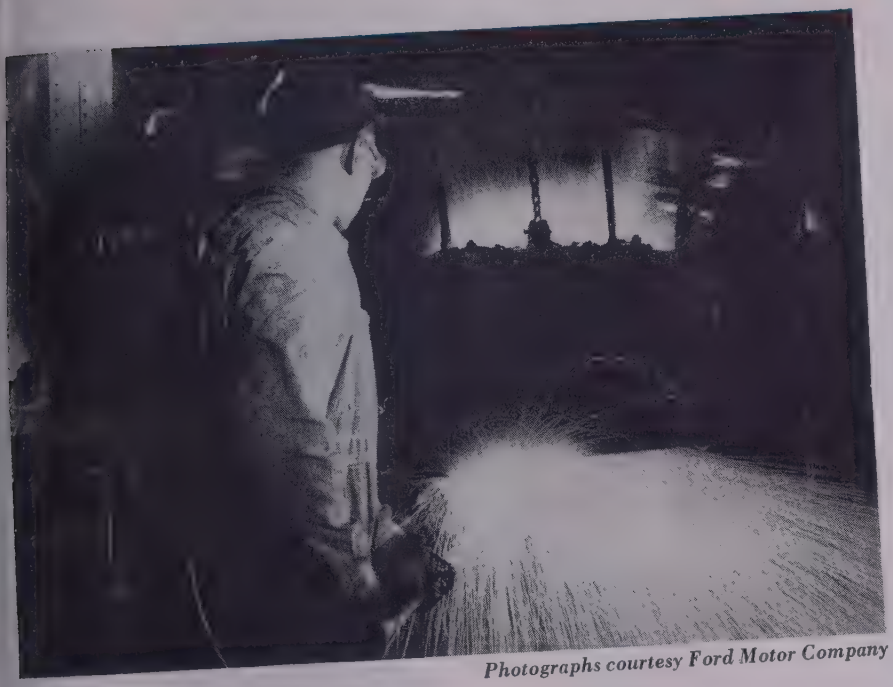
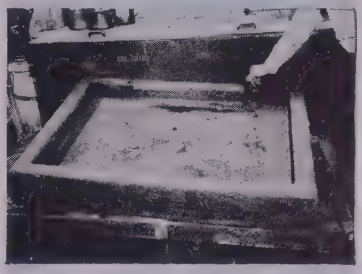


Photographs courtesy Ford Motor Company

KAOCAST, easy to use as ordinary concrete, can be mixed in mortar box or concrete mixer.



Shell of furnace door, cleaned, ready for installation of KAOCAST.

Shoveling KAOCAST into place. KAOCAST can also be poured like ordinary concrete, plastered in place, or applied with a cement gun.

A large automobile manufacturing firm found that high temperatures and severe operating conditions were playing havcc with the doors of their 15-ton electric furnaces. Run 16 hours a day, 5 days a week, these furnaces are poured every 2½ hours and are charged twice during each cycle. With a good grade of firebrick, furnace door linings lasted an average of only two or three days before replacements were necessary.

A trial installation of KAOCAST—the B&W high temperature Refractory Castable—was made. The KAOCAST doors stood up two to three weeks . . . *five to eight times longer than firebrick.* As a result, doors on all electric furnaces of this type are now lined with KAOCAST. *Savings in maintenance are running into thousands of dollars per year.*

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chromium carbide to precipitate at the grain boundaries because all carbon is tied up as columbium or titanium carbide. To be effective, it is necessary to add definite amounts of columbium or titanium. Generally, the amount of columbium is ten times the carbon, and the amount of titanium five times the carbon. The reason that it takes a larger weight of columbium than titanium is that each atom of columbium weighs approximately twice as much as each atom of titanium, and as each atom of columbium or titanium combines with one atom of carbon, the important criterion is the number of atoms available for combination with the carbon. The columbium addition has a further advantage in that it increases the high temperature strength. It is for this reas that the titanium bearing type 321 material is pr ferred for making seamless tubing by piercing. (the other hand, type 347 is generally preferred f making welded tubing because columbium types we better than titanium types.

It was early recognized that severe corrosion resi ance and freedom from intergranular attack could obtained by decreasing the carbon limit to 0.03 p cent carbon maximum, and recently alloys of tl type have been offered to the trade.

Because of their excellent toughness, the 18-8 typ of stainless steel are more difficult to machine th many steels. In addition, they have a marked te dency to work harden so that if tools are not ke sharp cutting proceeds with difficulty. To answ this problem of machinability, type 303 was develop Increased machinability was obtained by the additi

Fig. 13—Stainless steel is carefully tested and inspected at each stage in its manufacture, so that each and every lot is of the highest quality and uniform in size, workability and finish

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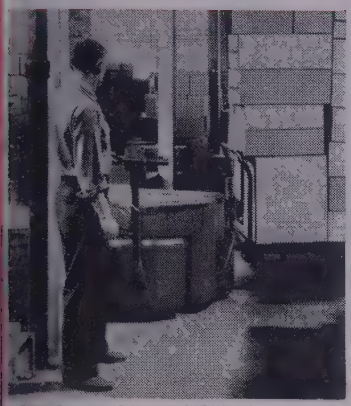

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of selenium or sulphur to the extent of about 0.20 to 0.30 per cent. The resulting selenides or sulphides act as a lubricant and also cause the chips to break up during machining as shown in Fig. 12. In evaluating machinability of the various grades of free-machining stainless steels, one should consider not only the speed with which they can be machined, but also the type of finish which can be produced. Improvement in machinability is reflected somewhat in the tensile properties as indicated by the following:

	Type 303	Type 302
Per cent elongation	50	60
Per cent reduction of area	55	70
Izod impact ft-lbs.	80	110

Austenitic stainless steels cannot be hardened by heat treatment and one must rely upon cold work to produce increased tensile strength and hardness. Type 301 was especially developed for high strength. This was accomplished by lowering nickel content to about 7 per cent. When nickel is lowered in this manner, austenite in the steel becomes less stable so that when cold worked it tends to transform over to the martensitic condition, the presence of which structure definitely increases tensile strength. This change makes the steel slightly magnetic. The following is an example of the increase in physical properties that may be obtained by using type 301 as compared with the regular grade, type 302[6].

Comparison of Properties—Cold Drawn 40 Per Cent in Reduction

	Type 301	Type 302
Tensile strength, psi	220,000	195,000
Yield strength, 0.2 per cent off set, psi	180,000	165,000
Per cent elongation	10	10
Rockwell hardness	C-42	C-40

It is frequently desirable to have an austenitic stainless steel which will not work harden too much during forming, such as in the manufacture of cold headed and deep drawn articles. As discussed under type 301, it was shown that work-hardening could be increased by decreasing the nickel. Likewise work hardening characteristics can be decreased by increas-

Fig. 15—Chipping surface of stainless steel billets to remove defects too deep for removal by grinding

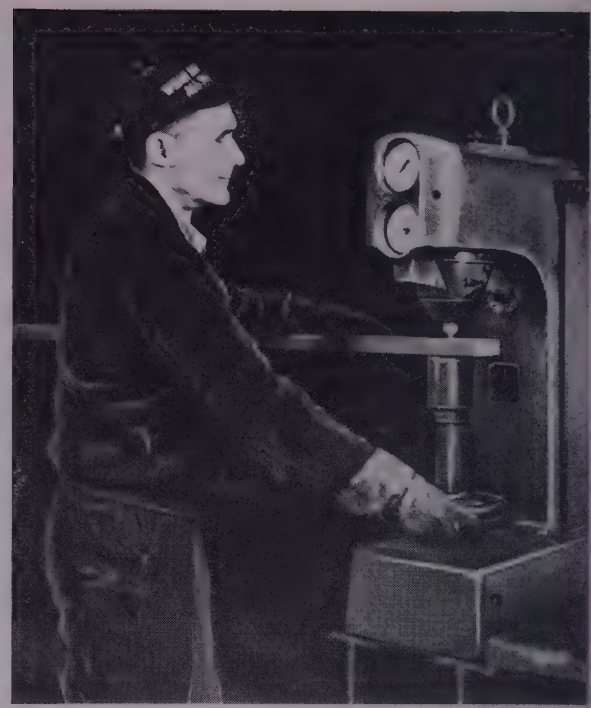


Fig 14—Testing stainless steel bar for hardness on a Brinell hardness machine to check efficiency o heat treatment

ing the nickel. The increase in nickel content s bilizes the austenite so that even during severe formation there is no transformation to the har martensite structure. Type 305 containing about per cent nickel is selected for these severe cold fo ing operations. A comparison of physical propert after 68 per cent cold reduction, shows:

	Type 305	Type
Tensile strength, psi	189,500	214.
Rockwell hardness	C-41	C-

Type 305 is also used where the finished part m remain strictly non-magnetic after severe defor tion. For example, under a magnetizing field stren of H = 100 Gausses, the permeability of type cold rolled 68 per cent reduction is 1.88 as compa with only 1.068 for type 305.

As chromium content of the chrome-nickel stainl steels is increased to 20 per cent chromium, there a marked improvement in the resistance to oxidat at elevated temperatures. To meet requirements high temperature applications, types 308, 309 and 3 containing 20 per cent chromium, 11 per cent nick 23 per cent chromium, 13.5 per cent nickel; 25 cent chromium, 20 per cent nickel, respectively, w developed. Increase in nickel content with increa chromium is necessary to maintain the austenitic c dition of the steel. Resistance to high temperat oxidation increases with the chromium content. Th steels not only have excellent high temperature pro ties but afford better general corrosion resista than the straight 18-8.

The scaling resistance of 18-8 may be improved only by adding chromium but by the addition of con as well, and furthermore the improvement can made with less increase in cost. Although scale

tance is increased with the addition of silicon, cor-sion resistance is generally decreased and this is ecially true in nitric acid. Types 302-B and 314 resent the silicon modified 18-8. Type 302-B is e same in analysis as type 302 excepting that it tains 2 to 3 per cent silicon. Type 314 on the er hand is similar to type 310 excepting that it tains 1.5 to 3.0 per cent silicon.

The resistance to corrosion of 18-8 types can be proved especially with regards to specific corrodents the addition of various elements such as copper d molybdenum. The most important alloys com-rcially available are those containing molybdenum typified by types 316 and 317. Type 316 contains o 3 per cent molybdenum and type 317, 3 to 4 per t molybdenum. Because the addition of molyb-num promotes the formation of ferrite and because is desired to keep the steel entirely austenitic, the kel content is increased when molybdenum is added. r example, type 316 contains 10 to 14 per cent kel and type 317 11 to 14 per cent nickel as com-ed with only 8 to 10 per cent nickel in the regular 8, but even then, especially when nickel is on the r side these alloys will contain some ferrite. The lybdenum especially increases the resistance to sea ter and has the further advantage of increasing elevated temperature strength of the steels.

ype 410 is the basic straight chromium stainless el containing on an average of 0.10 per cent car-n, 13 per cent chromium. Because of its low total y content, it is the least expensive of all the stain-s steels. This steel can be hardened by heat treat-nt to about 375 brinell hardness by cooling in ter, oil or air. In general, its physical properties quite similar to the 0.30 per cent carbon alloy els, such as SAE 2330, 3130, 4130 and 6130, plus fact that it is corrosion resistant. Because of its carbon content it may be used in either the an-led or the heat treated condition.

ype 403 is a selected high quality stainless steel practically the same analysis as type 410. It is d for the production of blades in steam turbines very highly stressed parts. Although physical perties of 403 are similar to those of 410, the qual-is superior due to the close inspection and rigid mical limits to which material is held by the man-cturers.

ype 416 is a free-machining grade analogous to and is used in automatic machines. Improved hinability is obtained by the addition of 0.20 to per cent sulphur or selenium with sometimes 0.50 cent molybdenum or zirconium. Sulphur or se-um additions produce sulphide or selenide inclu-s in the metal and these impart lubrication causing chips to break into relatively small pieces and r themselves in the automatic machines. Im-ved machinability is reflected in the decreased ghness of the steel as shown by the following lation[7]:

	Type 416	Type 410
le strength, psi	90,000	75,000
strength, 0.2 per cent off set, psi	40,000	40,000
ent elongation	25	30
ent reduction of area	60	75

raight chromium stainless steels of group A, such

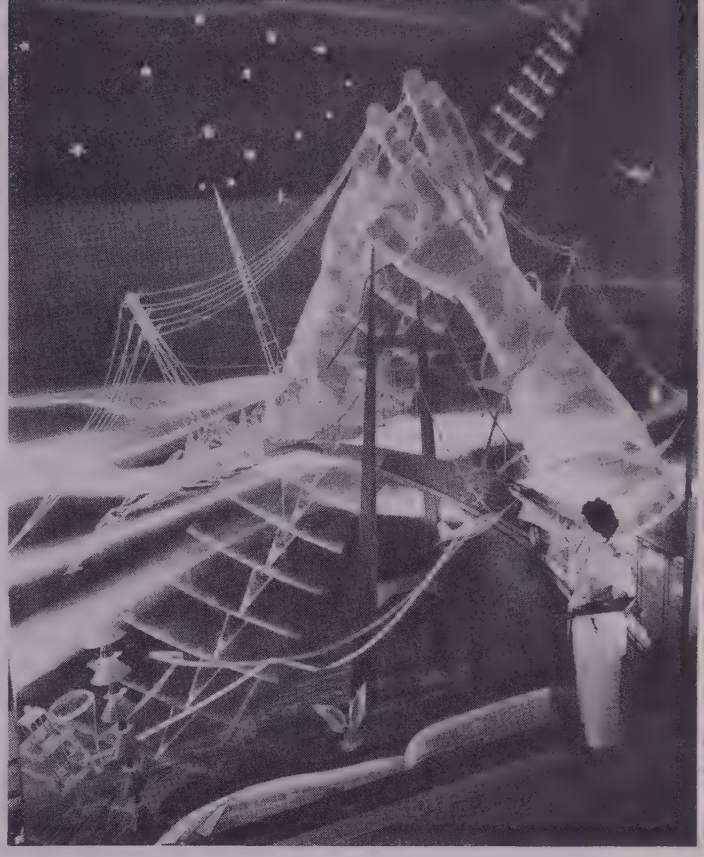


Fig. 16—Stainless steel also finds use as a fine arts medium. This mural painted on three sheets of steel, bolted together in the back, will last for eternity

as 410, harden when air cooled from high temperatures. In some applications as in welding this hardening is undecirable because of decreased ductility. It is possible to avoid much of this air-hardening by adding such elements as 4 per cent more chromium, 1 per cent silicon, or 0.20 per cent aluminum, the most economical of the three being the addition of aluminum. This steel is then known as type 405. The decrease in hardness obtained by oil quenching type 405 as compared with type 410 is shown in the following tabulation:

Oil Quench Temperature	Brinell Hardness Type 405	Brinell Hardness Type 410
1550°F	131	268
1650°F	193	318
1750°F	268	343
1850°F	283	356

Type 420 is the oldest of all the stainless steels and is known, even today, as the cutlery type. It is the steel originally patented by Brearley and contains generally 0.30 per cent carbon and 13 per cent chrome. It can be hardened merely by cooling in air to hardnesses as high as Rockwell C-50. It should always be used in the hardened condition. In the annealed condition the carbon and chromium are combined as discrete particles, so that the chromium is not available for resisting corrosion. During heating for hardening, the chromium and carbon dissolve in the iron and become available for corrosion resistance. Type 420 costs more than type 410 due to the greater difficulty in manufacture, and furthermore, it is somewhat more difficult to fabricate into articles.

Types 440A, 440B, and 440C are quite similar to

Fig. 17—Modern safe deposit vaults make most effective use of stainless steel

type 420 excepting they can be treated to a higher hardness due to higher carbon contents of 0.70, 0.85 and 1.05 per cent, respectively. These steels must also be used only in the heat treated condition. Because of the high carbon, all of the chromium carbide does not go into solution even during heat treatment and for this reason it is necessary that the steels contain 4 per cent more chromium than found in type 420. Increased hardness of these steels is obtained with the loss of some toughness, as shown by the following tabulation of torsion impact strength after hardening and drawing at 300°F:

Type	Torsion Impact Ft-lbs.	Rockwell Hardness
420	137	C-50
440-A	103	C-56
440-C	86	C-60

The corrosion resistance of chromium stainless steels is increased as the chromium content is increased. When chromium is increased from 13 to about 17 per cent, it is known as type 430 and is virtually non-hardenable by heat treatment. The following data demonstrate the improved resistance to corrosion of type 430 as compared with type 410:

	Type 430	Type 410
Nitric acid test	18	34
65 per cent HNO_3, boiling		
80 per cent acetic acid, boiling	186	350

The above data are included to show the comparative corrosion and it should not be inferred that these two steels are suitable for use in these two acids. This grade is also produced in a free machining gr known as type 430-F.

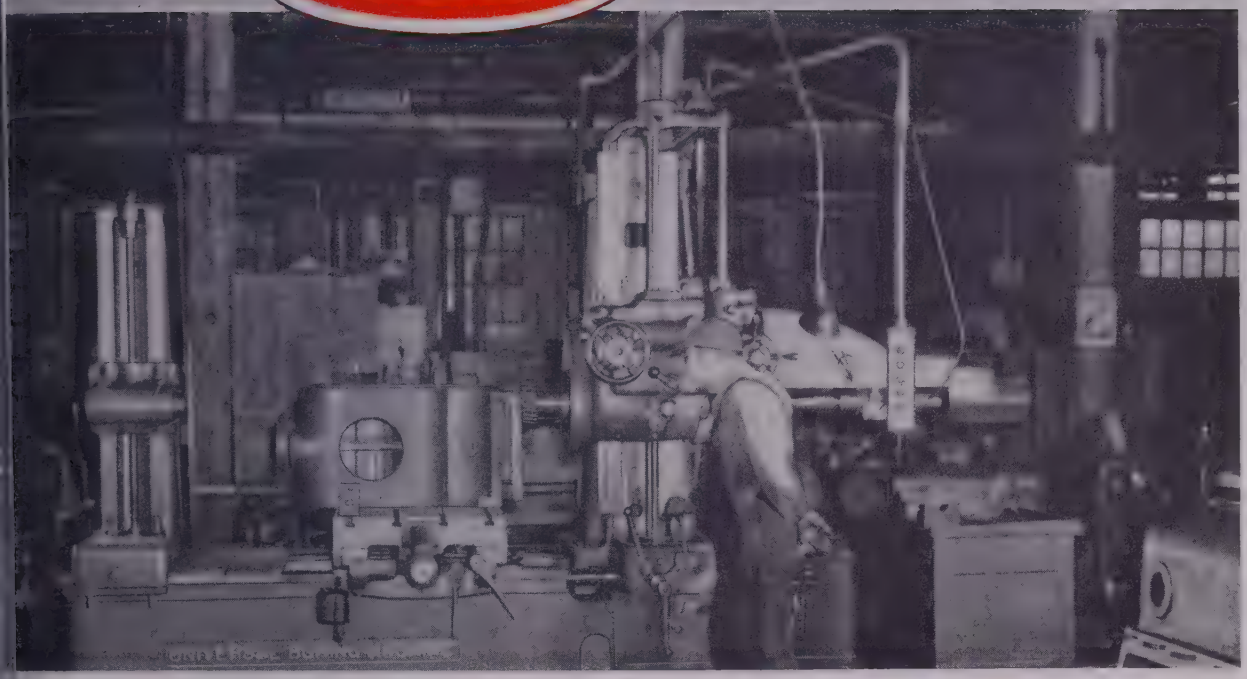
When a few per cent of nickel is added to t 410 stainless, the physical strength is increased in annealed cold worked and heat treated conditi Type 414, for example, is similar to type 410 but tains 2 per cent nickel. The physical properties hardened and drawn at 800°F compare as follows

	Loss mils per y	
	Type 414	Typ
Yield strength, psi	150,000	145
Tensile strength, psi	200,000	190
Per cent elongation	17	
Per cent reduction of area	60	
Brinell	400	3

As previously mentioned, when chromium is creased to about 17 per cent, the steel becomes manently ferritic at all temperatures, and consequ ly, cannot be hardened by heat treatment. It is sible by the addition of about 2 per cent nicke restore the hardening capacity of the steel. In way, the high corrosion resistance of the 17 per chromium steel is obtained, together with high pl ical properties. Type 431 is an example. It originally developed in England by Brown-Bay steel works, and was designated as "Two-Score". can be hardened to about 375 brinell hardness.

The highest chromium content of the commer straight chromium steels will be found in type which contains 27 per cent chromium and offers ceptional corrosion and scale resistance. The chromium may cause coarse grains when the allo heated and to overcome this, 0.15 to 0.20 per nitrogen is usually present.

BULLARD



Universal Boring, Milling and Drilling Machine at Kinney Manufacturing Company performing a milling operation.

Wherever you go *Universal?* Sure, the Old Reliable

The older Universals have been good — have proved their worth. Bullard-Universals will carry on this tradition.

Now Bullard lends an added touch — with sound engineering and field experience, Bullard engineers are modernizing numerous operating details in keeping with modern metal working standards.

Bullard-Universals presently offer many advantages for efficient and safe operation:

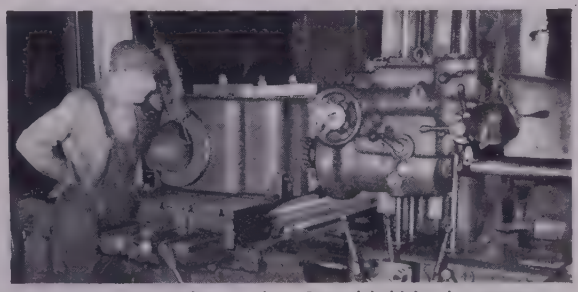
Efficient Hydrodynamic Drive providing Rapid Spindle reverse even at high speeds

Safety Push Button Control

Right Hand Controls

Ease of selecting operating functions

Wide range of capacities covering the 3" — 4" — and 5" spindle sizes.



Note convenient Safety Pendant Control held by the operator.

Let Bullard quote on your requirements.

THE BULLARD COMPANY • BRIDGEPORT 2, CONNECTICUT

Fig. 18—Bakery truck body is fabricated of stainless steel for long life and pleasing appearance

Some fabrication processes have previously been discussed. These were forging, wire drawing, cold rolling, annealing and pickling. Stainless steels are also capable of being fabricated by all methods familiar to other steels, namely, machining, blanking, punching, shearing, forming, deep drawing, spinning, cold heading, grinding, polishing, soldering, welding, and riveting. The physical properties of stainless steels do, however, dictate some differences in handling.

All high-chrome steels seem to have the peculiar property of galling or seizing when under very high pressure and in machining the chips tend to weld fast to the nose of the tool producing what machinists call a "bug". This slows down the job and impairs the finish. The chromium-nickel stainless steels also work-harden very rapidly so that the tool in passing over the work will harden the surface and thus interfere with the next cut. The best remedy is to reduce the cutting speed and not allow the tool to stop cutting and glaze the job. Special top rake and angles on the bits and drills used are recommended. Special cutting oils are also recommended for reducing tool abrasion and preventing the welding of chips to the tool. The real answer to machinability comes with the use of selenium or sulphur bearing free-machining grades which are available in both straight chromium and chrome-nickel types. Both sulphur and selenium reduce the galling and seizing tendency to produce brittle chips and make the steels extremely free-cutting. In England, lead has been added to stainless steels for the same purpose.

To successfully blank, punch, shear, spin or cold head stainless the following should be kept in mind. 1—Even when dead soft annealed, stainless steels are about fifty per cent stronger and harder than soft low carbon steel. 2—All stainless steels excepting the free machining types have a considerable tendency to gall, or pick up on the tools. 3—The chrome-nickel stainless steels are very tough and gummy. There will be little, if any, break-out on these in blanking and they must be cut clear through. T straight chrome steels have a more normal break-o 4—The chrome-nickel stainless steels are hardened cold work more rapidly than ordinary soft steel. Th is not true of the straight chrome stainless steels.

The above properties demand that the press us must be built ruggedly and tools must be made of t best grades of wear resisting tool steel.

The forming of stainless steels is aided by t proper selection of lubricants which will form a fi capable of withstanding the higher pressure and he generated. For cold heading, stainless wire is fu nished with the surface properly lubricated or co per coated.

Both austenitic and ferritic stainless steels can readily welded, and soft, or silver soldered, wh proper precautions are taken. It should be kept mind that austenitic chromium-nickel steels have higher expansion and electrical resistance, and a low heat conductivity and melting point than plain low c bon steel. These properties are of advantage in meta arc and electric resistance welding. In metallic a welding the use of direct current is much more ge eral than alternating current. Reverse polarity used, the working being negative and the weldi electrode positive; the rods are coated with spec flux to shield the molten metal from contact with atmosphere.

Welding rods are usually of a slightly different co position than the parent metal because of the t dency to lose a certain percentage of the alloy content. For example, about 1 per cent of the ch mium, 25 per cent of the columbium and 85 per c of the titanium bearing rods are not used and stabilized welds, columbium 18-8 is preferred. Ch mium-nickel rods are also frequently used for we ing straight chromium steels because of greater tou ness and superior corrosion resistance.

Electric resistance welding works out very satisf torily with stainless steels because of their high e trical resistance, low heat conductivity and lo melting point than plain steels.

Acetylene welding may be applied successfully stainless steels but is not as well adapted for gene work as the metallic arc, because it is slower troubles arise from flame adjustment. If the flam on the reducing side, the metal will pick up car and corrosion resistance will be decreased. If i slightly on the oxidizing side, the metal will fr in an unsound condition. It is therefore recommen that a neutral flame be maintained, but it shoul kept in mind that a slightly reducing flame is a le evil than one which is slightly oxidizing. As a g eral rule, acetylene welding is not recommended straight chromium stainless steels.

If precautions are not taken to prevent carbide cipitation, it may occur at the grain boundarie austenitic stainless steels during heating or coo in the range of 800 to 1500°F. It is for this rea that titanium and columbium bearing austenitic st less steels are preferred for welded structures, as lumbium and titanium each stabilize the carb When using austenitic steels which do not con columbium or titanium, it is advisable, if possibl

REPRINTS AVAILABLE

REPRINTS of previous articles in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. Subjects covered over the past few months include blast furnace, open hearth and electric furnace practice, tool steels, roll design, coke production, plates, sheets and strip, tin plate, structurals and rails, scrap bessemer steel, butt and lap weld pipe and seamless tubing.

ıneal the structures at 1900 to 2100°F prior to ıenching in water. This treatment puts the carbide ıck into solution.

Silver soldering is used with considerable success ı chromium-nickel stainless steels. One advantage ı compared with regular soldering is in its high rength. Because silver solder and fluxes work best the range of 800 to 1500°F, it is important that ldering be conducted as speedily as possible so as to minimize carbide precipitation. Of course, the element of speed is not a factor with columbium and titanium types. Straight chromium stainless steels can also be successfully silver soldered and because steels of group A harden when air cooled from temperatures above about 1500°F, a solder should be chosen which can be applied at temperatures below 1500°F.

Soft soldering is readily carried out on stainless steels but it is somewhat more difficult to get the solder to adhere unless special precautions are taken to use a flux which will cut through the chrome oxide film on the steel's surface. Muriatic acid cut with zinc is suitable. Solders containing as much as 80 to 85 per cent tin are recommended because they have less tendency to discolor in combination with stainless steel. It is most important in soldering to see that all the flux is removed after welding is completed.

REFERENCES

5. Steel Products Manual, AISI, Sec. 24, May, 1946.
6. ibid.
7. ibid.
8. ibid.

lirrors of Motordom

(*Concluded from Page* 66)

ısic "B" body adapted to both the 8 and 88 series, the difference being wheelbase and power plant. The 8, touted as one of the "hottest" ırs on the road, currently uses the A" body, as does the 76, and the 55-horsepower V-8 engine is almost o much engine for this size body. o far the "B" body has appeared in ly two types, two-door and four-oor sedans of the fast-back type. hances are additions will be made in e form of notchback or bustle-back ntours, both of which are included the "C" and "A" series.

Packard—As of Oct. 3 serial num-rs on all cars, including those in alers' hands, were changed to vint-e 1950, the sole change identifying xt year's models. Assembly opera-ons continue on reduced draft pend-g clarification of the steel tieup. s production moves ahead in the ıtomatic transmission department, it ill be offered on lower-priced models d conceivably the $225 price could offered on lower-priced models and nceivably the $225 price could be immed as volume picks up. The de-ce now is standard only on custom odels.

Plymouth — All possible steel has en diverted from other Chrysler visions to Plymouth to permit as-mblies to continue until Thanks-ving. After shutdown of a few ıys, the 1950 models will be started limited fashion, possibly only 400 500 per day, to allow sampling dealers. Schedules will continue low through December according to present planning which is based on reduced availability of steel and components. Assemblies of 1949 models have held in high gear, with close to 500,000 having been built, against 325,000 in the same months last year. An automatic transmission is a distinct possibility next year, to meet the competition of Ford and Chevrolet, despite the fact the Chrysler management has not pushed this development too strenuously.

Pontiac — Designs for 1950 were shown to the press last Thursday and will be displayed to a large group of suppliers Nov. 22. Goal for 1949 model production was 304,000 and by Oct. 31 the total had reached 290,615, of which less than 23 per cent were sixes. Hydramatic drive was specified on 67 per cent of all purchases. Next year's models will not be changed importantly, except for grilles, decorative trim, and a slight increase in horsepower of the 8-cylinder engine to smooth out acceleration with the automatic transmission. Enough steel was in sight before the strike's end for about 15,000 jobs, which could carry production for the balance of the year at slow motion.

Studebaker — A star performer among the independent manufacturers, this company has already built over 75,000 of its 1950 models since making a start in August. Steel inventory appeared sufficient to carry through this month and reduced operations may be necessary in December until stocks are balanced. Automatic transmission of the torque-converter type, being built by Borg-Warner Corp., was supposed to have been ready in December, but this date likely will have to be postponed due to production delays. The unit will be manufactured in a Detroit plant being tooled by the Detroit Gear Division of B-W.

Willys-Overland — Planning for a small passenger car, long under consideration during the regime of James D. Mooney, who left the company earlier this year, appears dormant, while manufacture of jeeps and trucks has faltered from the level of a year ago.

Export sales have been hit hard by currency devaluations. Assemblies this year have aggregated something under 80,000, compared with 117,000 in the like period of 1948.

Story of Malleable Iron

AUDIENCE is taken into the foundry and shown its operation in a 30-minute sound and color motion picture on the making of malleable castings. Entitled "This Moving World" and produced by Malleable Founders' Society, Cleveland, it shows uses of malleables in automobiles, railroad cars, farm implements, plumbing and electrical parts, etc.

Demonstrated is the durability of parts made of malleable castings, their resistance to corrosion and to impact and shock, and the ease with which they may be machined into finished parts. Film will be shown to engineering and technical societies, students in engineering schools, customers of the industry, business groups, etc.

In actual use, gage blocks are no longer kept under glass or handled with kid gloves. However, in this processing laboratory they remain "untouchable" to determine their size with 0.000001-inch, since body heat would offset the accuracy of the comparator as calibrated with the master block

Correct Manufacture And Use Determine

LASTING GAGE BLOCK ACCURACY

Gage blocks are being made today with a finer surface finish than was thought possible on a production basis just 6 years ago. This finish and accuracy of original measurement are not sole factors in their selection; stability of this size over long periods should be an important factor

By H. J. CHAMBERLAND
Research Engineer
DoAll Co.
Des Plaines, Ill.

WITH the steadily increasing demand for superfinishes throughout the metal working industry, it is not surprising to note that in recent months the U. S. Bureau of Standards has established a closer permissible surface finish for gage blocks. Previous to 1943 the bureau had no specific finish requirements; however, it thereafter determined that a 2.6 microinch finish should be recognized as a standard for all makes of gage blocks.

Because the Bureau of Standards now recommends and expects a 1.2 microinch finish on B grade blocks and recommends a 0.9 microinch finish on A grade blocks, these new tolerances should not be regarded as unreasonably rigid, considering the fact that a test-ground finish of 4 microinches is not unusual and superfinishes of 2 microinches are quantity production accomplishments.

True value of a complete set of gage blocks lies in the fact that 83 blocks make possible in excess of 100,000 individual measurements in terms of 0.0001-inch. Were as many blocks required to obtain these results, the subject would never come up for discussion.

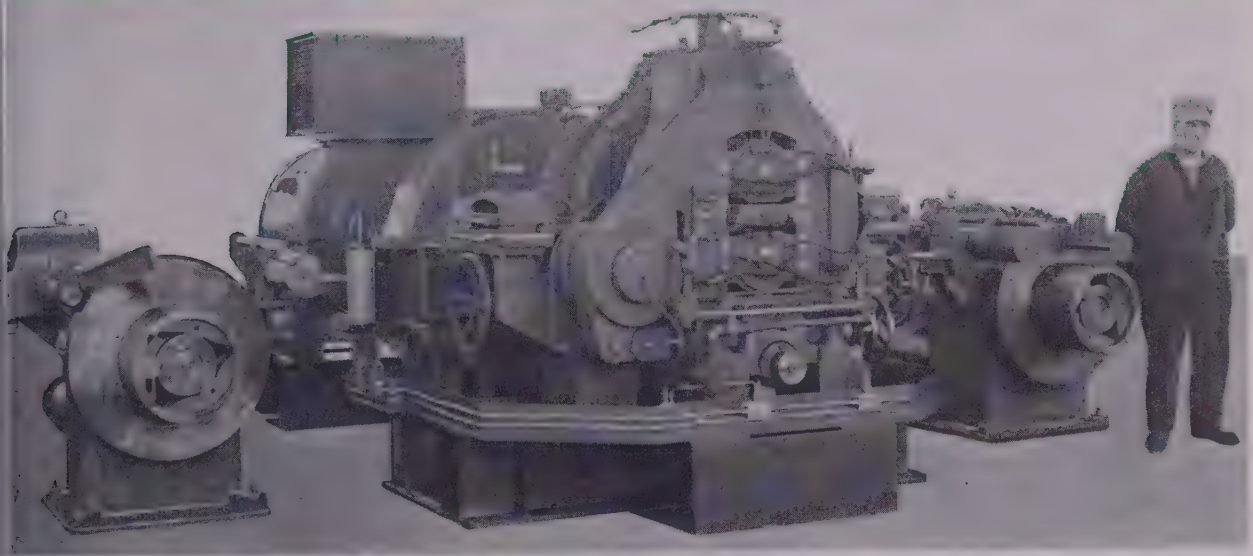
The prime requisite for ultimate precision of a gage block combination is naturally the ultimate in surface finish; accuracy of parallelism, flatness and dimension are taken for granted because all four qualities are inseparable. The finer the surface, the better and easier the wringability which in turn accounts for closest collective precision and longer life for the blocks.

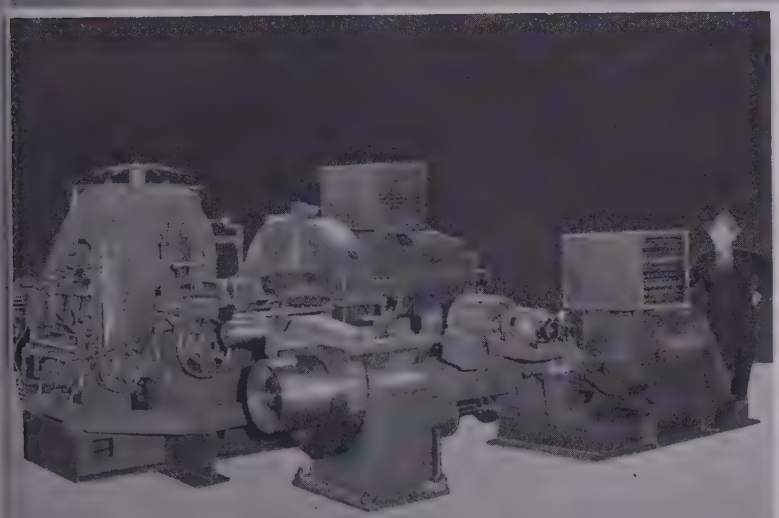
Select for Stability—Gage blocks should not be selected solely on the basis of their surface finish and original precision, but with absolute security that this original precision will be maintained for the longest period of time possible. This latter recommendation brings to mind the matter of stability and certain precautionary measures taken in the course of processing the blocks which tend to simplify their use and yet assure longer life and lasting accuracy. This is true of all grades of blocks but particularly so of B or "working" quality blocks familiar to tool, gage, die makers and numerous precision machine operators.

There are two steps in the processing of gage blocks which every maker rightly considers his life in this respect, namely, his heat treating and superfinishing techniques. the Bureau of Standards, it makes difference whether the blocks made of steel or any other metal alloy; the same specifications for surface finish and stability apply to makes. Thereafter it is a matter opinion as to which are most efficient in the long run, blocks that will tain their original accuracy the longest with the least unavoidable complications brought about by room temperature changes, or longer blocks involving repeated computations of coefficients of expansion

If used in an air conditioned room or laboratory at 68° F, all gage blocks are accurate regardless what they are made of. The fact remains that if the blocks are not made steel, the inaccuracy could be much as 0.00005-inch for every inches of length at a room temperature of 75° F. Inspectors of finish parts are usually in position to the expansion chart and thermometer; however, in the course of

Treadwell





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spection of work in process and toolroom practice, time consumed in making such adjustments could run up to a substantial total in the course of a year and this is exclusive of possible errors from or disregard for the compensating media.

One of the insidious qualities of some gage blocks is their inability to remain the same size over long periods of time. This size change comes from a condition within the steel in which the form of crystallization gradually shifts from one phase to another. The crystal form in one phase known as "martinsite" is needle-like in shape while its fraternal twin "austinite" is more rounded. Due to this structure, a change in volume takes place as the crystal form changes. The balance is such that the shift can be either one way or the other. In either event, if entire gage block changes in size we call them "growers" and "shrinkers".

"Growers" Hard To Spot—If the block happens to be a shrinker, the user of the gage blocks doesn't realize that this condition exists and assumes that the block is wearing smaller through use. Actually, the size is gradually shrinking until the block is worthless and such shrinkage can be quite appreciable. A 4-inch block can easily shrink 0.00001-inch in a month. A set of blocks made during World War I is known to have shrunk several tenths. A "grower", on the other hand, is even more difficult to spot because of the offsetting wear through daily use. In either event, however, growers and shrinkers are the bugaboo of the gage user. The growth is never uniform and causes warpage and distortion which finally effects the wringability in addition to size inaccuracy.

This problem is not only present for gage block users, it exists in practically all hardened tool steel parts. The point is that only a few millionths growth or shrinkage will ruin a gage block whereas this small change is never noticed on tools or parts of lesser accuracy.

Metallurgists at the Bureau of Standards recognize that a gage block is only as good as it will be 6 months or a year from now and have devised a simple test that tells if the block is going to change size. This consists of boiling the gage block for 24 hours in water to which a small amount of sodium bichromate has been added to prevent corrosion. If the gage does not change in size more than 0.000002-inch, it is assumed to be stable. This stability test is most reliable but how to heat treat the blocks to meet it is something the gage block maker keeps to himself.

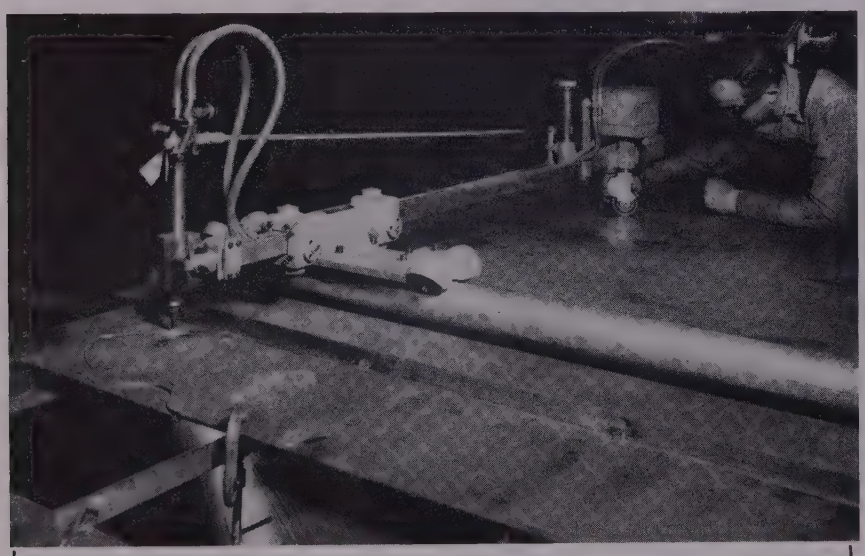
Test Verified—The dependability of the shrink-growth test above described, easily executed by anyone, was most recently verified whe set of new blocks made in 1943 sent to the Bureau of Standards a recheck. The report shows after six years, not a single bl had changed in size 0.000001-inch

To impart a 1 or 2 microinch r mean-square finish to gage block one thing, but making it worthw to the customer is another. Most jectionable to the maker, and less helpful to the inspector, lay man and skilled operator, have b the effects of the lapping opera on the rounded edges of the blo All gage block makers have alw been firm in their belief that lapp should be the final step, for that any preceding mechanical eration might disrupt more or the infinitesimal four-way per sible limits of the blocks.

Once the blocks are put to use is naturally assumed that the ra is intact and therefore serves intended purpose as a burr pre tive for the gaging surface. Thi indeed true of a ground radius tersecting a ground surface, h ever, once the flat surface is lap the microscope shows that the ab sharp edge nonexistent in theor actually present. What really h pens is no different than what should expect by first surface gr ing a piece of hardened steel, f grinding a 1/16-inch radius on edge and regrinding the surface depth of 1/32-inch.

It is obvious that after lapping surface of the gage block, the ra is no longer continuous but end a sharp edge as it intersects lapped surface. What is seen thro the microscope is a series of jagged disconnected "wires", con ing of metal forced out by the ab ing particles used in the lap process. In other words, a fine an phous metal or wire-edge builds at the extremities of the surface ing lapped as it wears away. S this formation is in the plane the gaging surface, it is not likel effect the wringing efficiency of blocks provided by the extremely surface finish. The fact remains these projections actually are th that they can be bent upward ease, and that the higher they the greater the inaccuracy and w

This undesirable condition now be corrected by a method where parabolic curve is introduced to move the "wire edge" and cause original radius to blend with lapped surface of the block. This finement in gage block proces has no ill effect on degree of ness, gaging area or the 65 Rock C hardness of the blocks along edge run.



CUTTING STEEL FALSIES: Shown forming special structural shapes designed to give a church an old colonial look without expensive timber forming is this Airco No. 3 Monograph oxyacetylene flame-cutting machine at Hustad Co., Minneapolis, Minn. Sections made from ¼-inch plate were shaped to 11½ inches wide and 7 feet 6 inches long. Developed by Air Reduction Sales Co., New York, the machine will cut steel up to 8 inches thick in any shape within a 32 x 56-inch area, at speeds ranging from 3 to 30 inches per minute. Cutting area of the 145-pound portable unit can be extended by addition of 6-foot 8-inch sections of tubular rail

ETTERS
o the Editors

nt: Ten Guides

Ve are anxious to obtain 10 copies a publication compiled by the edi- s of STEEL entitled, "Guide for Se- ting Tool Steels and Carbides." ase let us know if these are still ainable.

R. C. Moeller
Crucible Steel Co. of America
New York, N. Y.

opies of this reference guide are still ilable from STEEL's Readers' Service artment for $1 per copy.—The Editors

erest in Handling Article

n the May 2, 1949, issue of STEEL featured an article entitled, "Ef- ent Handling Methods Can Cut duction Costs." I wonder if it ld be possible to obtain a copy this story. Several people in our anization are very much interested reading it and we are unable to ate this particular issue.

Garrett Gething
Advertising Manager
Service Caster & Truck Corp.
Albion, Mich.

ite possible indeed. This was the first a series of six articles which appeared he May 2, May 9, May 16, May 23, May nd June 13 issues of STEEL.—The Edi-

m United Nations

Ve are interested in obtaining an- er copy of the special report, w Much Steel Capacity?" which eared in the March 21st issue of r journal. Thanking you in ad- ce for your prompt attention to request.

Yeh Chu-Pei
Economic Affairs Officer
United Nations
Lake Success, N. Y.

sign for Powder Met

ccording to the Oct. 1 issue of DO, there appeared in the August issue of your magazine an article tled, "Designing for Production Powder Metallurgy", written by Bonanno of Lionel Corp. If it is sible to send me a copy of this cle, it would be helpful in my line vork.

A. P. Higgins
Chief Tool Engineer
Fort Worth Division
Consolidated Vultee Aircraft Corp.
Fort Worth, Tex.

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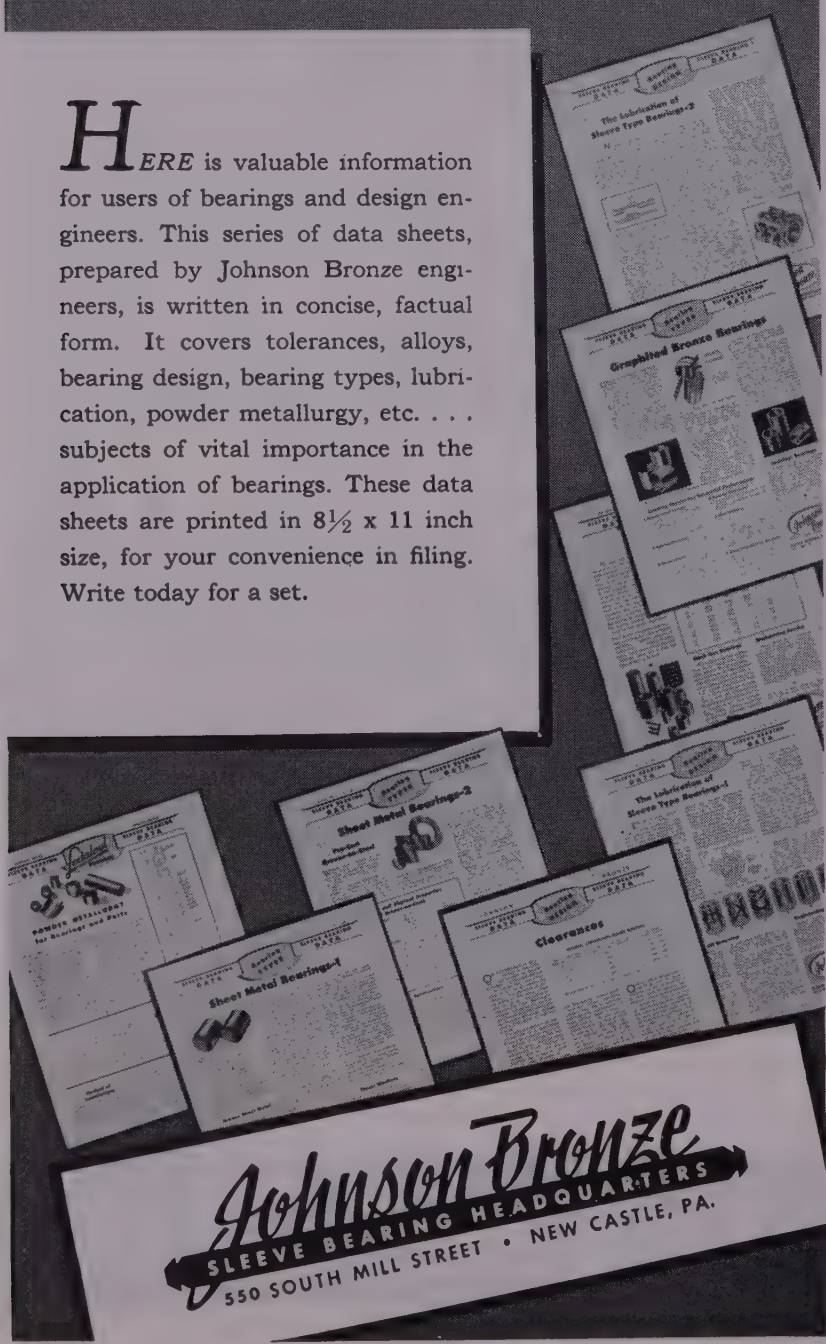

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and manufacture of pipe, as pu lished in the Sept. 5, 1949, iss Many of our supervisors and fo men in the Tube Division have e pressed a desire to have a copy the article, and I am wondering it would be possible for you to c tain for me about 25 copies for d tribution to foremen in the Tu Seamless and Conduit Departmen

H. E. Engelbaugh
Manager, Youngstown District
Youngstown Sheet & Tube Co.
Youngstown, O.

Copies of this article, and others in "Fundamentals of Steelmaking" series n be obtained from STEEL's Readers' Ser Department at a nominal cost.—The Edit

Nodular Alloy Data

We have been advised that y published a very interesting arti on nodular or ductile iron in one your recent issues. We are most terested in this article and won if you would be kind enough to se us tear sheets of the article to c New York address.

McDonald H. Wells
New York Manager
Lynchburg Foundry Co.,
New York, N. Y.

Tearsheets are being forwarded. Arti referred to were, "Economic and Safety vantages Seen for Improved Nodulizing loy," Sept. 5, 1949, issue, p. 82, and " You Producing Nodular Iron?" Sept. 12, 1 p. 152.—The Editors

Address Request Answered

In your April 25 issue of "The E itor Views the News," we are p ticularly interested in the item titled, "A New Attack on Rust". Y editorial did not give the name of t producer of this new corrosion sistant material. May we ask y to please supply this name for so that we can get in touch with t producer for full details.

Albert Neroni
Advertising Manager
John A. Roebling's Sons Co.
Trenton, N. J.

Producer of the corrosion resistant mate is Industrial Metal Protectives Inc., 137 Perry St., Dayton 2, O. The subject was covered in detail on page 80 of the April 2 issue of STEEL.—The Editors

Oxygen Distribution

In a bulletin from the Compres Gas Association there is an item c cerning distribution of oxygen a acetylene which they indicate wa feature in STEEL, Jan. 10, 1949. are very much interested in read this complete and will appreciate if you can send us a copy.

J. E. Rooney
Sales Manager
Bird Gas Corp.
Detroit, Mich.

A copy of the article, "Oxygen and Ac lene Gas Distributing System Used Effecti in Large Scrap Preparation Yard," is b sent.—The Editors

igh Speed Press Brake

Speeds up to 80 strokes per minute ay be obtained with the press brake ilt by Cyril Bath Co., 6972 Mainery Ave., Cleveland 3, O. It has de bed and ram areas for the ounting of punching and blanking es and is equipped with a pressntrol safety mechanism which may used in continuous operation or to

op automatically at the top of the oke. Accidental excessive loads tomatically throw out the clutch, eventing press or die damage.

Press illustrated is of 35-ton capay and has a die area of 15 x 42 hes. Heavier tonnages and larger areas are available. Machines y be set up to combine two or re operations in sequence.

ck No. 1 on Reply Card for more Details

utomatic Broach Accessories

Increased output efficiency through luced operator effort and reduefn in accident hazards due to operor fatigue or carelessness are proed by automatic broach handling uipment available for use on standd presses manufactured by Colonial oach Co., Box 37, Harper Station, troit 13, Mich. In an application a standard 6-ton, 36-inch stroke ility press for the finishing of casedened gear splines, the broach hdling mechanism consists of an omatic release type puller and a er receiver.

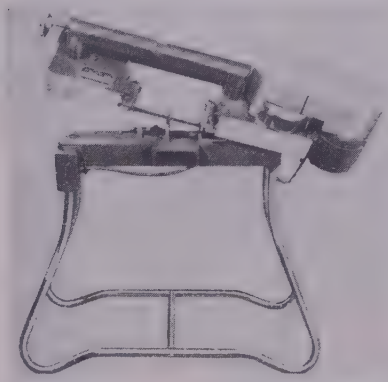
As broach is pushed through the ur its pilot contacts the broach eiver, forcing it down against a ght hydraulic pressure. At the sh of the stroke the broach is eased and the receiver lowers it ar of the work. After the finished t is unloaded, hydraulic pressure ses the broach receiver and broach and thus automatically reinserting the broach into the puller. Machine then returns to the starting position.

Check No. 2 on Reply Card for more Details

Band Saw With Automatic Stop

Small size metal cutting band saw, model 49A, announced by Wells Mfg. Corp., 1515 Fillmore St., Three Rivers, Mich., has a capacity of 3½ inches for rounds, 3½ x 6⅝ inches for rectangular shapes. The 0.025 x ½-inch by 5 foot blade is driven by a 1/6 hp ball bearing motor with manual start and automatic stop. A V-belt drive provides selective speeds of 54, 100 and 190 fpm.

Saw is equipped with quick action vise and adjustable blade guides.



Idler and drive wheels run on grease sealed ball bearings. Frame and bed are of welded steel construction.

Check No. 3 on Reply Card for more Details

Planer Has 33-Foot Stroke

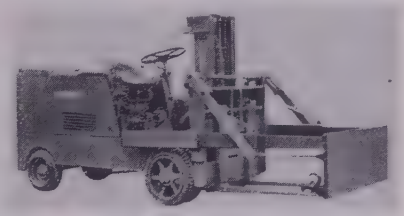
Speeds that are infinitely adjustable up to the maximum suitable for carbide cutting tools are incorporated in the hydraulic openside planer with 33-foot cutting stroke offered by Rockford Machine Tool Co., Rockford, Ill. Machine is 73 feet long overall and about 14 feet high. Speed of the return stroke may be set independent of the cutting stroke speed, so that a fast return can be used to save time. Planer is built with two cross-rail heads and one side head.

Maximum planing width for the right hand head is 60 inches and maximum planing width, including use of the left hand head, is 72 inches. Distance of table to rail is a maximum of 72 inches. Planers are built in openside and double-housing design. Both can be supplied with two tool heads for the cross-rail and one tool head for the vertical side rail, the second cross-rail head and the side rail head being extra equipment.

Check No. 4 on Reply Card for more Details

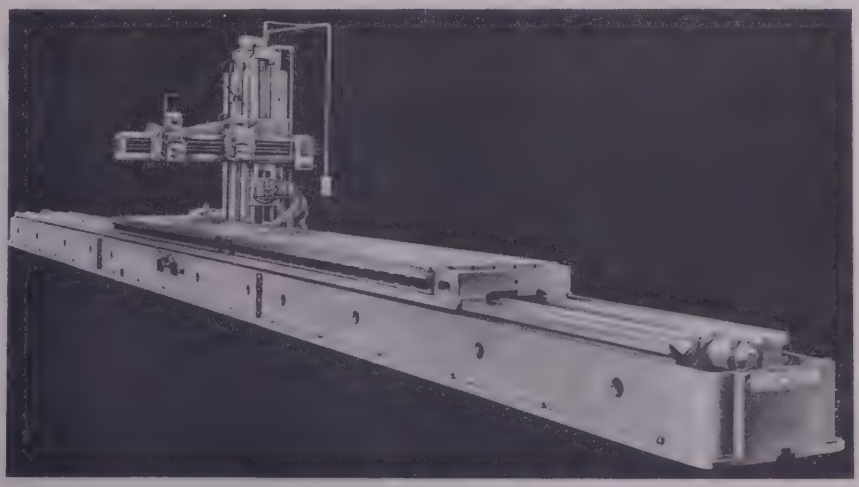
Truck Moves Heavy Dies

Heavy dies may be transported to and from the die table of a press by an unloader developed for trucks built by Towmotor Corp., 1226 E. 152nd St., Cleveland 10, O. Die is picked



up on the forks of the lift truck, transported to the press and easily deposited on the die table by extending the steel pusher plate of the hydraulically operated unloader.

Unit has capacity of 8900 pounds at 25 inches load center and a lift height of 72 inches. To remove die from



Heavy steel stock strapped faster, safer with tape!

IT'S A CINCH to strap heavy steel bars with "SCOTCH" Filament Tape No. 880. Over 5,000 "cable-like" strands of high-strength rayon fibres reinforce every inch-wide strip of this amazing new tape—just as steel bars reinforce concrete. Here, almost half a ton of odd-shape 16′ bars are being strapped with tape at Beals, McCarthy, & Rogers, Inc., heavy steel jobbers in Buffalo, N.Y.

FILAMENT TAPE is STRONG—up to 5 times as strong, 50 times as tear-resistant as most high-strength industrial tapes: EASY-TO-USE—holds at a touch without moistening, can't be scuffed loose, is as flexible as rope: ECONOMICAL—demands no skilled labor, no special equipment for application or removal: SAFE—no sharp edges to injure workmen or cut into materials. Available in Red, White, Blue, Black, and Transparent for product identification. Write Dept. S-119 today for further details.

ANOTHER 3M COMPANY PRODUCT

Made in U. S. A. by

MINNESOTA MINING & MFG. CO., St. Paul 6, Minn.

also makers of other "SCOTCH" Brand Pressure-Sensitive Tapes, "SCOTCH" Sound Recording Tape, "UNDERSEAL" Rubberized Coating, "SCOTCHLITE" Reflective Sheeting, "SAFETY-WALK" Non-Slip Surfacing, "3M" Abrasives, "3M" Adhesives.

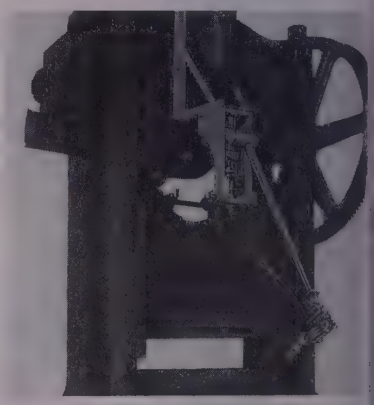
General Export: DUREX ABRASIVES CORP., *New Rochelle, N. Y.*
In Canada: CANADIAN DUREX ABRASIVES LTD., *Brantford, Ontario*

press table, a length of chain passed around the die and linked hooks on each side of the push plate. By retracting unloader arm the die is pulled onto the tru forks.

Check No. 5 on Reply Card for more Det

Device Unloads Presses

Sheet metal stampings may be moved from small and medium si punch presses automatically by junior size Iron Hand, developed Sahlin Engineering Co., 467 So Woodward Ave., Birmingham, Mi It is for presses with bed wid ranging up to 72 inches and pr sure capacities up to 250 tons. Pr



operator is required only to pl the part in the press, leaving hazardous job of removal to the I Hand.

By concentrating on the feed of the press, operators often can s up production as the unloader be set to catch every stroke. Dev is self-contained and may be tra ported from one press to anot It removes blanks or formed arti with equal effectiveness. Synchro ation with the press stroke is by e tric control. Parts weighing 20 pou or more may be removed.

Check No. 6 on Reply Card for more De

Welder Assures Tight Fit Up

Increased tong pressure results better spot and easy operation as as furnishing sufficient pressure welding with poor material fit according to Miller Electric Mfg. Appleton, Wis., manufacturers of improved toggle-action, tong le portable spot welder. Lever r be adjusted to either close tight the work or to pivot past center lock tight on the work. Opera can close the welder on the mate to be spotted, forcing it up t and locking it together, and t operate the switch with his o hand.

Design assures uniform pres

every spot. Adjustment is pro-
ied between lever and tongs to
mpensate for various thicknesses
metal. At the rear of the handle,

other adjustment regulates the dis-
ce the handle closes. Welder may
used either with or without a timer
trol.

ck No. 7 on Reply Card for more Details

achinery Aligning Level

Bullard Co., Bridgeport 2, Conn.,
nanufacturing 18 and 27-inch pre-
on aligning levels. The bubbles in
vials of the levels have a sensi-
ness of 5 seconds of arc per grad-

on. This is equivalent to show-
a variation of 0.0003-inch per

ial is mounted on two brass studs
ch permit adjustments. Level
ing is insulated from the palm
a hand by means of a handle of
conductive material. Vial is made
optical glass and the casting has
seasoned, machined and scraped.

k No. 8 on Reply Card for more Details

ck Handles Multiple Units

oxes, barrels, etc., which are han-
in multiple units, may be moved
out the use of pallets by the
ication of the Pak-Loader fork
k system developed by Yale &
ne Mfg. Co., Roosevelt Blvd. &
leman Ave., Philadelphia 15, Pa.
ds comprising many individual
ainers are pushed into position
ransportation vehicles in one op-
on.

stem comprises two components,
fork truck equipped with pusher
anism and two or three special-
apted steel plates per fork truck.
s are cut to the size which best
the specific load to be handled.
about 4 inches high are secured

On the road, for example, it's as easy to drive as any ordinary truck. On the job, its control makes a hit with operators. MICHIGAN'S air ram clutches are fast and smooth . . . they take the work out of operating. My operators *like* those finger-tip air controls—and *I* know that they've paid off in faster, more efficient operation . . .

And then there's MICHIGAN'S *remote control.* When you pull onto the job, you're ready to go! There are no draglinks to disconnect, no adjustments to make. You can drive and steer from the turntable cab with the cab in any position. The turntable engine supplies the power.

Take all these easy-handling advantages together and you can see why I advise you to get a MICHIGAN!"

Write for Bulletin 100—
"On the Job with MICHIGAN"

DID YOU KNOW
you can buy
a brand new
MICHIGAN
TRUCK CRANE
complete with chassis
for as little as $10,250
F.O.B. factory?

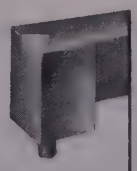
MICHIGAN

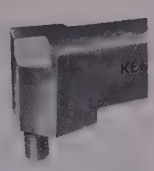
MICHIGAN POWER SHOVEL COMPANY
392 Second Street, Benton Harbor, Michigan, U.S.A.

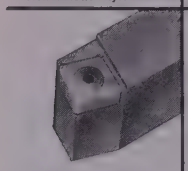
Kennamatic Style RAR

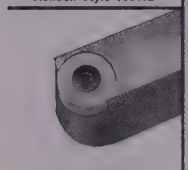
Kennamatic Style TAR

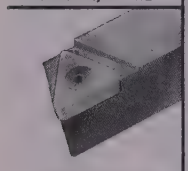
Kennamatic Style TBR

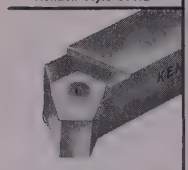

Kennamatic Style TFR


Kennamatic Style SBR


Kendex Style 11SKD


Kendex Style 3RKD


Kendex Style 3TKD


Kendex Style 11PKD

Planer Tool Style 11PH

Planer Tool Style 9PH

Planer Tool Style 59PM

Here They Are

KENNAMETAL Developments in Mechanically-Held Tooling for Better Production at Less Cost

Kennametal mechanically-held tools are outstanding in their performance, and in the savings they effect, because:

THEY ELIMINATE THERMAL STRAINS

The inherent strength of Kennametal is more fully utilized. Harder grades can be used on heavy jobs at coarser feeds.

THEY SIMPLIFY TOOL SETTING

Tips can be repositioned, or replaced, without disturbing the tool holder.

THEY REDUCE GRINDING COSTS

Procedure is simpler and less frequently required. No steel needs to be ground – only the carbide. Indexing feature of Kennamatic and Kendex tools provides multiple cutting edges between regrinds.

THEY LOWER INVENTORY

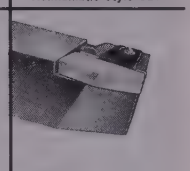
Fewer tools are required to float a specific job, and only tips or inserts need to be stocked.

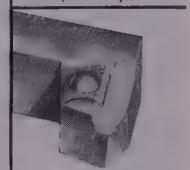
THEY INCREASE MACHINE PRODUCTIVITY

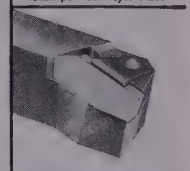
Down time is minimized because fewer tool changes and adjustments are required.

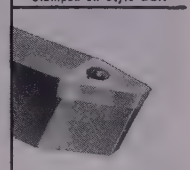
Our field representatives are fully equipped to help you apply this advanced tooling technique for better production at less cost. Ask them to demonstrate.

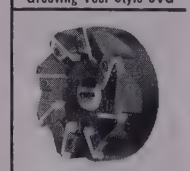
The tools illustrated are made in both hands, in various sizes, with Kennametal tips suitable for machining steel, cast iron, and non-ferrous alloys.

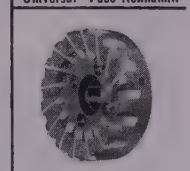

Clamped on Style BLH


Clamped-on Style FLH


Clamped-on Style GLH


Grooving Tool Style SVG


"Universal" Face Kennamill


"CF" Face Kennamill

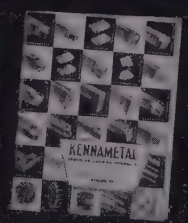
"AF" Axial Face Kennamill

Does Kennametal Inc. Manufacture Brazed Tools, and Blanks?

Yes—Kennametal Inc. produces and sells directly to the user a greater number of different carbide tools of both brazed and mechanically-held types than any other manufacturer.

Send for Catalog 49

It shows the most complete and diversified line of carbide tools ever offered.



KENNAMETAL Inc.
SUPERIOR CEMENTED CARBIDES
LATROBE, PA., U. S. A.

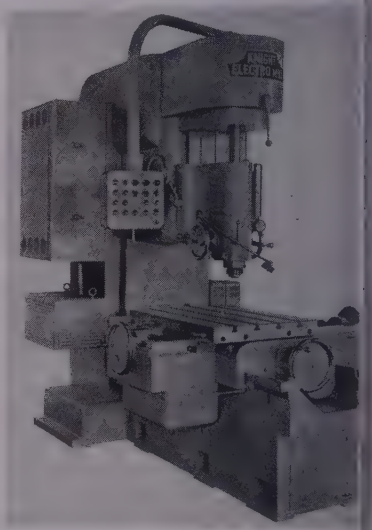
to one end of the plate. A bl
of wood is placed under the toe
keep it level and the forks of
truck slip under the plate for l
ing. When unloading, forks are til
forward to rest the front end of
loaded plate next to the pile of go

already stored. As the truck pus
is extended, the truck moves ba
wards and a locking device ho
the steel plate on the forks and p
vents it from being pushed off w
the load.

Check No. 9 on Reply Card for more De

Machine Allows Operation Cho

Wide latitude in selecting vari
features to meet specific requireme
are given the user of the Electro
vertical milling, drilling and bor
machine, manufactured by W.
Knight Machinery Co., 3920 W. F
Blvd., St. Louis 8, Mo. It may



equipped with variable speed mo
for wide versatility or constant sp
motors for specialized produc
work. Changes may be made w
desired to suit changing work
ditions on milling, drilling, bor
routing, jigs, fixtures, experime
or production work.

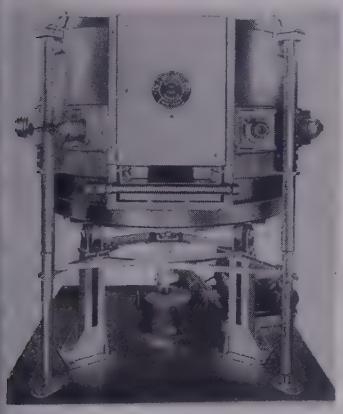
Table and saddle travel on ro
and are designed to eliminate o
hang, yet are compact enough
both table and saddle handwheels
be operated simultaneously. A h

belt drive and built-in flywheel with riable speed range provide smooth ve. Feed and feed changes are ctronically controlled. Safety itches prevent jamming feed or erloading drive.

ck No. 10 on Reply Card for more Details

rge Furnace is Portable

Low heating cost, uniform heating le and minimum amount of scaling e features of the rotary hearth ge furnace built by W. S. Rockwell C., 200 Eliot St., Fairfield, Conn. hough working hearth is 4 feet in meter, furnace will produce up to



pounds of forgings per hour, ted to 2100° F. Work is charged discharged through a single slot, ches wide and 2½ inches high. lot has a water cooled sill which vents heat from creeping back g the bar. Atmosphere is con- led to produce a light scale that flake off easily with the first mer blow. Gas burners are de- ed to permit a slight amount of oil to be introduced into the fur- atmosphere during the heating ation. Heating time is from 12 6 minutes, but may be changed longer or shorter cycle.

k No. 11 on Reply Card for more Details

draulic Power Units

tandard hydraulic power units in line announced by Rucker Co., 3 Hollis St., Oakland, Calif., range h 2 to 75 hp, with special mod- being available for requirements o 300 hp. Pressures are 1000 and psi, with special models up to 00 psi. Accessories make stand- models adaptable for various s of specialized installation re- ements.

nits are equipped with single or pressure systems and constant variable volume pumps. The oil em has welded and baffled oil rvoirs of oversize capacity with

FIFTY-FIVE TON heats are regularly poured by this Size KT Moore Rapid Lectromelt Furnace. With a KVA rating of 15,000 and a shell diameter of 17′0″, this big Lectromelt is ideal for heavy production jobs. It possesses all the famous features which put Lectromelt ahead of the metal melting field: topcharging, patented counterbalanced electrode control system, low electrode consumption and rugged overall durability.

Lectromelt Furnaces are available in sizes ranging from 100 tons to 250 pounds. Write today for the Lectromelt catalog for detailed information.

PITTSBURGH LECTROMELT FURNACE CORP.

PITTSBURGH 30, PA.

manufactured in: CANADA, Lectromelt Furnaces of Canada, Ltd., Toronto 2; ENGLAND, Birlec, Ltd., Birmingham; SWEDEN, Birlec Elektkougnar A/B, Stockholm; AUSTRALIA, Birlec Ltd., Sydney; FRANCE, Stein et Roubaix, Paris; BELGIUM, S. A. Belge Stein et Roubaix, Bressoux-Liege; SPAIN, General Electrica Espanola, Bilbao; ITALY, Forni Stein, Genoa.

MOORE RAPID Lectromelt FURNACES

STEEL
Warehouse
SERVICE

Complete Stock

Structural Shapes • Plates • Checker Plates • Sheets • Strip • Hot Rolled and Cold Finished Bars •

Welding Equipment and Electrodes

ALUMINUM METAL BUILDING PRODUCTS

LEVINSON
STEEL SALES CO.
32 PRIDE STREET
PITTSBURGH, PA

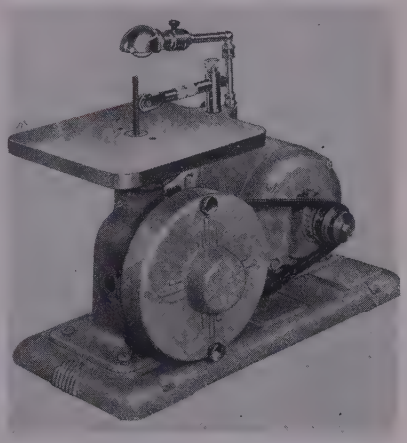
LSS-2

ample oil filtration. Optional equipment includes heat exchangers, immersion heaters, thermometers and other controls. Portable units are also available.

Check No. 13 on Reply Card for more Details

Variable Stroke Die Filer

A double eccentric accomplishes a variation in the stroke length from 3/16 to ¾-inch in the die filer offered by Benchmaster Mfg. Co., 2952 West Pico Blvd., Los Angeles, Calif. Reciprocating mechanism is spring loaded, automatically compensating



for wear and eliminating need for adjustment. Neoprene bellows keep filings out of the bearing surrounding the reciprocating shaft.

Crank and pulley shafts are supported in ball bearings lubricated by a built-in reservoir. The 8½-inch square table tilts front and back.

Check No. 13 on Reply Card for more Details

Roller Conveyor Table Top

Extra heavy loads may be moved to and from the Portelvator, a portable elevating table made by Hamilton Tool Co., Hanover at Ninth,

Hamilton, O., by a roller conveyor top for the table. It fits over the top table surface and is held in place by a flange. Installation and remo may be as required.

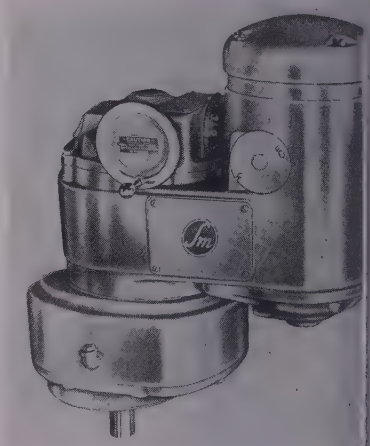
Tops are also available with rol mounted at the ends and either s can be furnished with a cam o ated roller locking device. Featu of the table include a mecanical which locks the table automatic at any height at which the tabl stopped, rapid lifting and lowe for light loads and accessibility all sides.

Check No. 14 on Reply Card for more De

Adjustable Speed Motor

Herringbone rotor, labyrinth s and heavy duty ball bearings are corporated in the Speed-Trol vert mounted motor with variable sp available from Sterling Electric tors Inc., 5401 Anaheim—Telegr Rd., Los Angeles 22, California. I available with integrally built h cal gears.

Speed indicator allows infinite sp adjustment through either the fin



tip control on the motor or thro mechanical, electrical or lever- controls. Power unit is built in rally with pulleys, shafts and b Because of the face mounted struction, the unit is useful for tator drives and for building into chines.

Check No. 15 on Reply Card for more D

Electronic Motor Controller

A fractional horsepower Mot-O- electronic adjustable-speed m controller, offered by Westingh Electric Corp., Pittsburgh 30, starts, stops and controls the sp of ⅛ to ½ hp dc motors, oper from single-phase, 50/60, 220/4 power sources. Unit uses arma control to make possible a s range of 20 to 1 at constant to Smooth, stepless speed control is sured at either speed increase o crease. Dynamic braking, ove

low-voltage protection are pro-
d. It is supplied for separate
nting.

No. 16 on Reply Card for more Details

chine Cuts Wet or Dry

daptable for either wet or dry
ing is the model 15 abrasive cut-
machine, offered with either 3
hp motor by Campbell Machine
sion, American Chain & Cable
Inc., Bridgeport, Conn. It will
tubes, angles, bar stock, etc.,
in its capacity with a minimum
urr by the use of a suitable abra-
wheel. Ferrous or nonferrous

rial, including corrosion resisting
s and hardened and annealed
s may be handled.
so within its range are light wall
g of all types up to 1½ inches
ameter and solid bar stock up to
ch in diameter with the 3 hp
r or light wall tubing up to 2
s and solid bar stock up to 1
with the 5 hp motor.

No. 17 on Reply Card for more Details

P-MOUNTED LUBRICATOR:
loped for applications where
limitations prohibit installa-
of large lubricators, type LPM
cator, a small, sump mounted
is introduced by Bijur Lubricat-
Corp., Long Island City 1, N. Y.
a piston type unit with a filter
revent foreign particles being
n into distribution system.

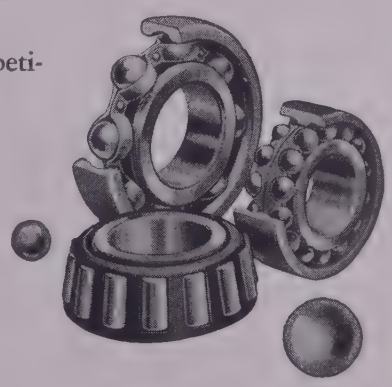
ES GAGING PROBLEMS: A
of electronic relay switches of-
by Coral Designs, Forest Hills,
., makes available a basic unit
nlimited use in automatic con-
and gaging devices. It pro-
means of using simple contact
e units of "off-on", two-posi-
three-position, or floating type
llers to solve pressure, torque,

GREATER LOAD CAPACITY

HOOVER BALL BEARINGS with HONED RACEWAYS

Hoover Ball Bearings provide greater load capacity — longer life . . . plus values made possible by honed raceways, an exclusive Hoover feature. For Hoover honing goes a step beyond grinding and polishing in producing finer, smoother raceway surfaces. Closer race curvatures furnish a wider area of ball support for greater work . . . greater bearing surface for extended life.

Thousands of manufacturers of quality products have gained a competitive advantage in their markets by using Hoover Ball Bearings with honed raceways. Upon request, a copy of the Hoover Engineering Manual will be sent to engineering and purchasing executives.



The Aristocrat of Bearings

HOOVER BALL AND BEARING CO., ANN ARBOR, MICH.

HOOVER

AMERICA'S ONLY BALL BEARING

WITH HONED RACEWAYS

position, movement and other gaging problems. Contact ratings may be obtained for controlling 5, 10 or 35 amp at 115 v ac.

FASTENER HAS CONCAVE HEAD: Head of the cap-captive screw offered by Alden Products Co., Brockton 64, Mass., will accept a standard Allen wrench or screwdriver. Top of head is concave so that when using screwdriver to get at screws located deep in an assembly, screwdriver follows curved surface until it slips into slot.

ELECTRODE HOLDER: Operating under continuous duty cycle at 725 amp on ⅜-inch electrodes the new 6S electrode holder offered by Martin Wells Inc., Los Angeles 1, Calif., remains cool.

FOR INDICATING TEMPERATURES: Thermo Electric Co. Inc., Fair Lawn, N. J., introduces a multipoint pyrometer and quick coupling connector panel assembly designed for indicating temperatures from one to six thermocouple locations. Operating ranges are from 75 to 400° F, 1000, 1600, and 2300° F and minus 300° to plus 300° F or equivalent centrigrade scales.

ELECTRODE FOR SHEETS AND PLATES: A general purpose electrode, Eutectrode 6000 for steel sheet and plates is offered by Eutectic Welding Alloys Corp., New York 13, N. Y. For both alternating and direct current, this arc welding electrode is recommended for single or multiple pass welding where fit up is poor. Available in sizes 3/32, 1/8, 5/32 and 3/16-inch.

LOOSENS PARTS: Kano Kroil, a chemical for loosening stuck together parts is offered by Kano Laboratories, Chicago 1, Ill. It dissolves dried oils, rust and corrosion and supplies necessary lubrication to loosen part.

SPLITS SAMPLES: Precision Scientific Co., Chicago 47, Ill., introduces a new small riffle sampler for laboratory sample reducing of all granular or powdered materials such as ore, sand, cement and chemicals. It is enclosed in a dust-tight case.

ECONOMICAL USE OF POWER: A new 115 v, 1/100-hp, single-phase alternating current motor with permanent capacitor is offered by Electro-Aire Inc., North Hollywood, Calif. Designed for many hours of intermittent duty without maintenance and for reversible applications, its high speed of 400 cycles allows an economical use of power for its 8.3-ounce weight.

LOWER MELTING POINT: Known as Agile coated bronze No. 200 welding and brazing rod, an electrode announced by American Agile Corp., Cleveland 3, O., is fully flux coated and made in 18-inch lengths in ⅛, 3/16 and ¼-inch diameters. It has a melting point of 1596° F.

CONVENIENT STORAGE: A rack for the convenient storage of 3-foot lengths of standard drill rod is offered by Hill Machine Co., Rockford, Ill. Ends of the rods rest in steel trays between adjustable separators. Any size is easily selected by pulling its tray forward.

CONVERTS USED DRUMS: Any used 30 or 55 gallon drum can be converted to a fire-safe waste container by use of the self-closing drum cover announced by Protectoseal Co., Chicago 8, Ill. If temperature within or surrounding the drum reaches 160°, a fusible link melts, releasing a spring loaded plunger.

SPRING-DRIVEN CORD REEL: To automatically wind portable cords used in connection with electronic crane weighing systems and similar applications, J. L. Gleason & Co. Inc., Cambridge 41, Mass., has developed a spring-driven reel.

80 TO 100 PSI PRESSURE: Designed without tie rods, a new line of air cylinders is announced by Tomkins-Johnson Co., Jackson, Mich. They have air pressures of 80 to 100 psi. Available in seven different styles, up to 8-inch bore, with or without adjustable cushions.

HIGH TEMPERATURE INSULATION: Bigelow-Liptak Corp., Detroit 2, Mich., offers a complete line of high temperature insulation products. BL-17, a mineral wool all-purpose block for temperatures of 1700° F has a density of 1.67 pounds per board foot. C-18, a companion product to block, is an insulating cen composed of mineral wool, long f asbestos and an adhesive binder. is applied like plastic.

RETAINS ACCURACY: Preci angle plates, announced by R Granite Surface Plate Co., Dayto O., are made of black granite t tolerance of less than 1 second. linear dimensions, this is a toler of 0.00005-inch in 12 inches. Pl can be made with any desired n ber of faces finished.

CORROSION RESISTING VALV A new line of Durco plug valves been developed by Duriron Co. New York 17, N. Y. for heavy corrosive service. Type B has lu cant screw and spring loaded c valve located in plug shank. is retained in body by bolted bor

HANDLES 500 POUNDS: D nated as No. 40 PC, a new type able pallet crane is offered by G Specialties Co., Chicago 22, Ill., handling shipping cases and ba in and out of trucks, cars, etc., ha ing dies, coils, motors, engines similar items. Capable of han up to 500 pounds, the heavy plate pallet is 16 x 24 inches in

RIGHT ANGLE DRIVE UNIT: new stock right angle drive designated RA-2, is announced Ohio Gear Co., Cleveland, O. It special spiral bevel gears, case h ened and matched and lappe pairs after hardening. Both i and output shafts are 1¼-inch d eter. Capacity is from 6 to 12 h

MEASURING MECHANICAL ACTION: BA-1 bridge and a fier, announced by Ellis Associ Pelham 65, N. Y., is designed complete control of all SR-4 g and similar instrumentation. drives any standard cathode oscilloscope; covers a wide freq cy range from static to high quency.

FOR MORE INFORMATI
on the new products and equip
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Helpful Literature

High Temperature Carbides
ennametal Inc. — 4-page folder, lement 1 to publication No. 255, ents information on physical erties of Kennametal grades in class. They have high strength resistance to oxidation at 1800° F above, high modulus of elas- y and superior thermal shock tance.

Pressed Steel Turntables
ardinge Co. — 4-page illustrated tin No. 48 presents information ressed steel turntables designed any material processing or indus- operation where rail cars are . Rail gage sizes range from o 60 in. for cars with wheel s of 3 to 10 ft.

Transparent Plastic Models
hm & Haas Co.—12-page illus- d booklet "Plexiglas for Prod- Demonstration" shows how trans- nt acrylic can be used to build ing and exhibit models to demon- e product design and operation. on properties and various forms is plastic are tabulated.

Stainless Clad Rolled Steel
an Wood Steel Co.—8-page illus- d folder "Permaclad Stainless Flat Rolled Steel" describes rial available in sheets and s which combines corrosion-re- nce and other surface charac- ics of stainless steel with form- qualities of carbon steel.

Plating & Processing
eaker Co.—36-page illustrated let No. 148 depicts types of con- rized automatic and semiauto- c plating and processing equip- . in line and suggests methods mproving efficiency and economy ating operations.

Zinc Cleaner
thone, Inc.—1-page illustrated et deals with Enthone zinc er 20 anodic alkaline electro- er for degreasing zinc base die- ngs prior to plating with copper ickel. Properties and operating uctions are included.

Grinding Machines
cinnati Grinders Inc.—20-page rated publication No. G-566 dis- s 6 and 10-in. plain hydraulic ing machines for precision cyl- cal work and, with attachments, raverse and infeed grinding. Ma- s are usable for tool room job r long-run production work.

Induction Heating Unit
dberg Engineering Co., High ency Heating Div.—2-page il- ted bulletin T-1420 discusses l LI-25 high frequency vacuum single-station induction heating suitable for heating metals and electrical conducting materials.

80. Wirebound Containers
Wirebound Box Manufacturers Association—16-page illustrated booklet "What to Expect from Wirebound Boxes and Crates" covers such subjects as construction principles, basic styles and advantages of wirebound shipping containers. Features of containers include small storage requirements before use, speedy assembly, ease of handling, low tare weight and low initial cost.

81. Wire Rope Slings
John A. Roebling's Sons Co.—72-page illustrated catalog A-900 presents information on wire rope, grommet and Flatweave slings as well as on wire rope fittings. Many different designs are listed, construction discussed and loads classified.

82. Hollow Spindle Lathes
R. K. LeBlond Machine Tool Co.—4-page illustrated folder No. HS-111 deals with hollow spindle lathes available in 16 and 20-in. sizes with 5¼ and 9-in. hole through spindle, respectively. Among features are electric brake with apron spindle start-stop control, hardened and ground steel bed ways, one-piece apron, and thrust-lock tailstock.

83. Time Recorder
International Business Machines Corp.—6-page illustrated form No. 53-5717-1 describes IBM consecutive spacing alternating current time recorder with electronic self-regulation. Time stamps, recorders and signals can be self-supervised and kept on system time without special clock or signal wiring.

84. Testing Instrument
Sperry Products, Inc.—4-page illustrated bulletin No. 50-105 deals with Reflectoscope type UR ultrasonic instrument for instantaneously locating defects in metals and other materials by application of single searching unit. Penetrating to depth of 30 ft of material, it can be used for testing raw stock, semifinished pieces or finished products.

85. Fuel Oil Additive
E. F. Houghton & Co.—6-page illustrated folder "Houghto-Solv" discusses fast-acting fuel oil additive which thoroughly dissolves sludge in oil storage tanks and entire system. Making sludge burnable with oil, it improves operating efficiency of heating system and eliminates need for cleaning system.

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86. Scientific Equipment

Burrell Corp.—16-page illustrated "Announcer of Scientific Equipment," No. 49-10-36, presents brief history and modern trends in analysis of gases. Given are historical background and major developments in progress of analysis from Von Helmont's work in sixteenth century until present time. Recent laboratory equipment is listed also.

87. Shielded Arc Welding

Air Reduction Sales Co.—16-page illustrated catalog No. 9 is descriptive of inert-gas shielded-arc Heliwelding process. Booklet explains process and where to use it and also contains sections on equipment for manual, semiautomatic and automatic operation; new automatic filler-wire feeder and power supply equipment.

88. Spring Steels

Sandvik Steel, Inc.—32-page illustrated catalog No. 50 is guide to cold rolled and bright annealed spring steels and hardened, tempered and polished spring steel. Production processes are detailed and complete specifications for various sizes listed. Metric, hardness and temperature conversion; wire gage sizes and weight of spring steel are tabulated.

89. Geared-Head Lathes

American Steel Foundries, King Machine Tool Div.—Two illustrated catalogs S-1 and S-101 present information on standard and special type Sebastian geared-head lathes, respectively. Latter include gap, clutch, brake and other types.

90. Flexible Shaft Machines

Pratt & Whitney Div., Niles-Bement-Pond Co.—4-page illustrated circular No. 521 describes series M Kellerflex multiple speed flexible shaft machines for burring, filing, sanding, grinding, wire brushing or polishing.

91. Industrial Wire Baskets

Cleveland Wire Cloth & Mfg. Co.—Illustrated bulletin No. 8 describes use and application of industrial wire baskets. Listed are most commonly used styles, types of metal used and all data necessary for ordering for specific applications.

92. Collet Chucks

Sutton Tool Co.—Illustrated catalog describes Porst line of Levermatic and Handimatic collet chucks. Highlighted is external and internal gripping and releasing feature of chucks. Attachments, accessories and operating suggestions are given also.

93. Automatic Machinery

New Britain Machine Co.—D file "It Can Be Done" contains illustrated leaflets presenting histories of production probl which have been solved by use automatic machinery. Enginee details are presented on each c and important operations are picted.

94. Open Back Presses

Clearing Machine Corp.—8-pag lustrated bulletin 211 explains tures of open back inclinable pre which are available with 30 to ton capacity and are adaptable wide variety of work including bla ing, forming, drawing and ass bly operations.

95. Nonferrous Castings

Wellman Bronze & Aluminum —16-page illustrated catalog No describes nonferrous castings wood and metal pattern operati Included are data on magnesium loys, polishing of aluminum, W Cast castings, copper base alloys pattern shrinkage of Ampco.

96. Helical Gear Drives

Foote Bros. Gear & Machine C —16-page illustrated enginee manual MPA gives data on M Power enclosed helical gear dr in single, double and triple reduc types. Space is devoted to ser factors, load characteristics, rat and selection factors.

97. Hydraulic Cylinders

Hydraulic Equipment Co.—4-p illustrated folder No. C-20649 is standard design, single and dou acting cylinder assemblies. Rec mended operating pressures, ef tive diameter, stroke required other vital information are given

98. Combustion Chambers

National Carbon Co.—Illustr catalog section M-9602 depicts eq ment for production of hydr chloride gas by burning hydrogen chlorine. It describes graphite bustion chamber and imperv graphite burner nozzle and out operation of complete system.

99. Indirect Heaters

Black, Sivalls & Bryson, Inc.- page illustrated catalog 54, sec 3, part 1, is designed to aid in s tion of efficient indirect heater job requirement. Description, feat and specifications of indirect he and procedures for solving gas oil heating problems are set fort

100. Industrial Relays

Ward Leonard Electric Co.- page illustrated catalog No. D shows seven standard types of netic relays for industrial and eral-purpose control applicat Complete technical data on ratings, dimensions, coil spec tions and applications are incl

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9	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
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Market Summary

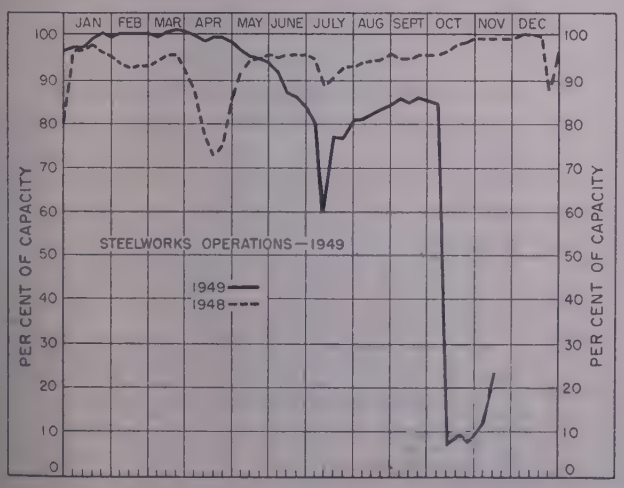
INDUSTRIAL paralysis has been averted, but effects of the steel and coal strikes will be felt for months. Steel supply, especially flat-rolled products, will be short through April, maybe longer. It will take time to rebuild coal stocks though prompt resumption of mining has brightened the outlook considerably. Hopes are high the mine truce will extend beyond Nov. 30. Repairs to blast furnaces and steelworks will delay full operations at some reactivated plants. Quick snap-back of metal fabricating will be prevented by depleted and unbalanced steel inventories. Rationing, at least of an informal nature, appears a certainty. Meanwhile, warehouse, gray market and conversion tonnage will not be sufficient to bridge the gap.

STRIKE LOSS— More than 8,500,000 net tons of ingots were lost from 1949 production in the six weeks since the strike's start. Assuming agreements are quickly reached with remaining struck plants, an additional loss of at least 2 million tons will be suffered as the mills get into operation. Direct-strike loss, therefore, will total around 10.5 million tons, equal to nearly 8 million tons of finished steel valued at over $700 million, not including extra charges. Steelworkers lost an estimated $178 million in wages. Even should welfare package gains average 10 cents per hour, it will take the workers 100 weeks to make up their wage loss. In addition, incalculable millions were lost in wages and production in the fabricating industries forced to curtail because of short steel supplies.

PRODUCTION—Operations are increasing as more mills get back into production and by the end of this week the rate will attain a "respectable" level. Last week the national ingot rate increased 12 points to 24 per cent of capacity. Operations advanced 14 points to 14 per cent at Cleveland; 41 points to 73½ at Buffalo; 4 points to 41 at Detroit; 35 points to 65 in Eastern Pennsylvania; 5 points to 5 at Youngstown; ½ point to 6 per cent at Chicago. The ingot rate at Wheeling was off 1 point to 60 per cent.

DELIVERIES— Specifying against contracts is heavy with the mills resuming. Tight supply looms for the next several months—into second quarter—in a number of products. Some prompt shipments are being made by reactivated mills from tonnage on hand at the strike's start and are against old orders. These, however, are not indicative of the overall situation. Delivery delays will extend into second quarter on sheets and strip. Most mills are not promising hot carbon bar tonnage under two months, while shape deliveries range up to eight weeks. Plates are relatively easy. Some producers expect to be in position to ship on new orders within three weeks after resuming operations. Anticipating a scarcity market, consumers are displaying increasing interest in conversion steel and some contracts have been placed. Gray market offerings are rising. Meanwhile, with inventories depleted or badly unbalanced fabricating operations are headed toward further curtailments.

PRICES—Uncertainty is mounting with respect to the price trend. Undertone of the market is strong, and all talk of declines has vanished. Conversion ingot currently is offered at $80 per ton against the standard price of $50. Isolated increases are expected before yearend but no industry-wide price move is anticipated before first quarter. It will take that long at least for producers to determine cost of the welfare package, estimates currently ranging up to $4 per ton. The cost will vary among the separate interests. STEEL's weighted index on finished steel holds at 152.52 and the arithmetical composite is unchanged at $91.64. Scrap shows increasing signs of strength but the composite on steelmaking grade is steady at $28. Price composites on pig iron also are unchanged at $45.60 for basic, $46.10 for No. 2 foundry, and $47.27 for malleable.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Nov. 12	Change	Same Week 1948	Same Week 1947
Pittsburgh	2	None	97	102
Chicago	6	+ 0.5	99	95
Eastern Pa.	65	+35	95	93.5
Youngstown	5	+ 5	105	91
Wheeling	60	— 1	92.5	93.5
Cleveland	14	+14	96.5	95.5
Buffalo	73.5	32.5*	104	88.5
Birmingham	6	None	100	99
New England	58	None	90	87
Cincinnati	52	None	103	91
St. Louis	91.5	None	82.5	77.5
Detroit	41	+ 4	99	92
Western	29.5	+ 8	..	..
Estimated national rate	24	+12	99	97

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Change from revised rate.

Composite Market Averages

	Nov. 10 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$91.64	$91.64	$91.64	$95.05	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT..	28.00	28.00	26.75	43.25	16.16

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Nov. 10 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh ...	3.35	3.35	3.35	3.35–55	2.15
Bars, H.R., del. Phila. ...	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C.F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40–60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa. ..	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pittsburgh ..	3.25	3.25	3.25	3.25–30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh ..	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh ..	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25–70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh ...	4.00	4.00	4.00	4.00–75	2.80
Strip, C.R., Chicago	4.00–15	4.00–15	4.00–15	4.00–25	2.90
Strip, C.R., Detroit	4.20–25	4.20–25	4.20–25	4.20–50	2.90
Wire, Basic, Pittsburgh ...	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh ...	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh.	$7.75	$7.75	$7.75	$6.70	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–52.00	51.78–52.00	52.00–53.57	67.00	34.00
Wire rods, 7/32-⅜", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham..	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	135.00

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts. ..	$29.50	$29.50	$29.75	$42.75	$16.50
No. 1 Heavy Melt. E. Pa. .	25.00	25.00	25.00	45.25	15.50
No. 1 Heavy Melt, Chicago.	29.50	29.50	27.00	41.75	16.50
No. 1 Heavy Melt. Valley..	32.75	29.25	31.25	42.75	16.25
No. 1 Heavy Melt. Cleve...	30.25	26.50	26.50	42.25	15.25
No. 1 Heavy Melt. Buffalo.	27.25	27.25	28.25	48.50	17.00
Rails, Rerolling, Chicago..	44.50	44.50	41.50	68.50	22.25
No. 1 Cast, Chicago.....	41.50	41.50	41.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl. .	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl. .	15.75	15.75	15.75	17.00	7.75
Oven, Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	17.62½-18.50	17.625	23.50	12.00
Zinc, E. St. Louis	10.00	9.75	9.25	15.50	8.25
Lead, St. Louis	12.55	12.80	14.05	21.30–35	6.35
Tin, New York	94.50	94.00	96.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	32.00	38.50	38.50	14.50
Nickel, refinery, duty paid	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Be m
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$4
Newark,del.	50.63	51.13	51.63	5
Brooklyn,N.Y.,del.	....	52.79	53.29	.
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	.
Woodward,Ala. W15	38.88	39.38	....	.
Cincinnati,del.	....	46.08	....	.
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	.
Tonawanda,N.Y. W12	46.00	46.50	47.00	.
N.Tonawanda,N.Y. T9	....	46.50	47.00	.
Boston, del.	55.26	55.76	56.20	.
Rochester,N.Y.,del.	48.63	49.13	49.63	.
Syracuse,N.Y.,del.	49.58	50.08	50.58	.
Chicago District				
Chicago I-3	46.00	46.50	46.50	4
Gary,Ind. C3	46.00	....	46.50	.
IndianaHarbor,Ind. I-2	46.00	....	46.50	.
So.Chicago,Ill. W14	46.00	46.50	46.50	.
So.Chicago,Ill. C3	46.00	....	46.50	4
So.Chicago,Ill. Y1	46.00	46.50	46.50	.
Milwaukee,del.	47.89	48.39	48.39	4
Muskegon,Mich.del.	....	51.98	51.98	.
Cleveland District				
Cleveland A7	46.00	46.50	46.50	4
Cleveland R2	46.00	46.50	46.50	.
Akron, del. from Cleve.	48.39	48.89	48.89	4
Lorain,O. N3	46.00	....	....	4
Duluth I-3	....	....	46.50	.
Erie,Pa. I-3	46.00	46.50	46.50	4
Everett,Mass. E1	....	50.50	51.00	.
Geneva,Utah G1	46.00	46.50	....	.
Seattle,Tacoma,Wash.,del.	....	54.20	....	.
Portland,Oreg., del.	....	54.20	....	.
LosAngeles,SanFrancisco,del. ...	53.70	54.20	....	.
GraniteCity,Ill. M10	47.90	48.40	48.90	.
St.Louis,del.(incl. tax)	48.65	49.15	49.65	.
Ironton,Utah C11	46.00	46.50	....	.
Minnequa,Colo. C10	47.00	47.50	47.50	.
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	4
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	
McKeesRocks,del.	46.95	47.45	47.45	4
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	4
Verona,del.	47.90	48.40	48.40	4
Brackenridge,del.	48.13	48.63	48.63	4
Bessemer,Pa. C3	46.00	....	46.50	4
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	
McKeesport,Pa. N3	46.00	....	....	4
Sharpsville,Pa. S6	46.00	46.50	46.50	4
Steelton,Pa. B2	48.00	48.50	49.00	4
Steubenville,O. W10	46.00	....	....	.
Struthers,O. S16	46.00	....	....	.
Swedeland,Pa. A3	48.00	48.50	49.00	4
Philadelphia,del.	49.44	49.94	50.44	5
Toledo,O. I-3	46.00	46.50	46.50	4
Cincinnati,del.	51.01	51.51	....	.
Troy,N.Y. R2	48.00	48.50	49.00	.
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	.
Youngstown C3	46.00	....	....	4
Youngstown Y1	46.00	46.50	46.50	4
Mansfield,O.,del.	50.26	50.76	50.76	5

• Low phos, Southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 2.25%.
Phosphorous: Deduct 38 cents per ton for P content of 0.70% and
Manganese: Add 50 cents per ton for each 0.50% manganese ove or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per to each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%

Jackson,O. J1, G2	$5
Buffalo H1	6

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$7
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2.....	7
Keokuk,Iowa, OH & Fdry, 12½ lb, piglets, frt. allowed K2..	8
Wenatchee,Wash. OH & Fdry, frt. allowed K2	7

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon o base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$8

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$5
Steelton,Pa. B2	5
Philadelphia delivered	5
Troy,N.Y. R2	5

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Nov. 10, 1949; cents per pound unless otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

OTS, Carbon, Forging (NT)

roit R7 .....$50.00
nhall,Pa. C3 .....50.00

OTS, Alloy (NT)

roit R7 .....$51.00
ston,Tex. S5 .....59.00
land,Pa. C18 .....51.00
nhall,Pa. C3 .....51.00
Duquesne,Pa. C3 ...51.00

ETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

semer,Pa. C3 .....$52.00
rton,Pa. C3 .....52.00
shohocken,Pa. A3 ..57.00
ley,Ala. T2 .....52.00
rfield,Ala. T2 .....52.00
tana,Calif. K1 .....71.00
y,Ind. C3 .....52.00
nstown,Pa. B2 .....52.00
kawanna,N.Y. B2 ..52.00
nhall,Pa. C3 .....52.00
ron,Pa. S3 .....52.00
Chicago,Ill. C3 .....52.00
Duquesne,Pa. C3 ...52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 .....$61.00
alo R2 .....61.00
ton,O. R2 .....61.00
rton,Pa. C3 .....61.00
eland R2 .....61.00
shohocken,Pa. A3 ..63.00
roit R7 .....61.00
ley,Ala. T2 .....61.00
rfield,Ala. T2 .....61.00
tana,Calif. K1 ....80.00
y,Ind. C3 .....61.00
ena,Utah G1 .....61.00
ston,Tex. S5 .....69.00
Harbor,Ind. I-2 ...61.00
nstown,Pa. B2 .....61.00
kawanna,N.Y. B2 ..61.00
nhall,Pa. C3 .....61.00
Duquesne,Pa. C3 ...61.00
hicago,Ill. C3, R2..61.00
ren,O. C17 .....61.00

Alloy (NT)

lehem,Pa. B2 ....$63.00
alo R2 .....63.00
on,O. R2, T7.....63.00
hohocken,Pa. A3 ..65.00
oit R7 .....63.00
ana,Calif. K1 ....82.00
.Ind. C3 .....63.00
ston,Tex. S5 .....71.00
nstown,Pa. B2 ....63.00
awanna,N.Y. B2 ..63.00
illon,O. R2 .....63.00
and,Pa. C18 .....63.00
nhall,Pa. C3 .....63.00
on,Pa. S3 .....63.00
icago,Ill. C3, R2..63.00
quesne,Pa. C3 ...63.00
ren,O. C17 .....63.00

T BARS (NT)

sfield,O. E6..(GT)$58.00
smouth,O. P12 ....52.00
on,Pa. S3 .....52.00

OIDS, SEAMLESS TUBE (NT)

on,O. R2 .....$76.00
land R2 .....76.00
Harbor,Ind. I-2 ...76.00
illon,O. R2 .....76.00
icago,Ill. R2 ....76.00

KP

ippa,Pa. J5 .....3.25
nhall,Pa. C3 .....3.25
en,O. R2 .....3.25
ngstown C3, R2 ....3.25

VI RODS

amaCity,Ala. R2 ..3.40
land A7 .....3.40
ora,Pa. A7 .....3.40
eld,Ala. T2 .....3.40
ton,Tex. S5 .....3.95
Harbor,Ind. Y1 ....3.40
nstown,Pa. B2 .....3.40
Ill A7 .....3.40
angeles B3 .....4.20
ssen,Pa. P7 .....3.40
burg,Calif. C11 ....4.05
smouth,O. P12 .....3.40
icago,Ill. R2 .....3.40
owsPoint B2 .....3.50
ing,Ill.(1) N15 ....3.40
hers,O. Y1 .....3.40
nce,Calif. C11 ....4.20
ester,Mass. A7 ....3.70

STRUCTURALS
Wide Flange

Bethlehem,Pa. B2 .....3.30
Lackawanna,N.Y. B2 ..3.30
Munhall,Pa. C3 .....3.20
So.Chicago,Ill. C3 .....3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 .....4.95
Bessemer,Ala. T2 .....4.95
Bethlehem,Pa.(14) B2 ..5.05
Clairton,Pa. C3 .....4.95
Fairfield,Ala. T2 .....4.95
Fontana,Calif. K1 .....6.10
Gary,Ind. C3 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.95
Johnstown,Pa. B2 .....5.05
Lackawna,N.Y.(14) B2 ..5.05
Munhall,Pa.(14) C3 ....4.95
So.Chicago,Ill.(14) C3 ..4.95
Struthers,O. Y1 .....4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 .....3.25
Bessemer,Ala. T2 .....3.25
Bethlehem,Pa. B2 .....3.30
Clairton,Pa. C3 .....3.25
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....3.80
Gary,Ind. C3 .....3.25
Geneva,Utah G1 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2 ....3.25
Johnstown,Pa. B2 .....3.30
KansasCity,Mo. S5 ....3.85
Lackawanna,N.Y. B2 ..3.30
LosAngeles B3 .....3.85
Minnequa,Colo. C10 ....3.75
Munhall,Pa. C3 .....3.25
Niles,Calif.(22) P1 .....3.97
Portland,Oreg. O4 .....3.90
Seattle B3 .....3.90
So.Chicago,Ill. C3, W14 .3.25
So.SanFrancisco B3 ....3.80
Torrance,Calif. C11 ....3.85
Weirton,W.Va. W6 .....3.25

Alloy Stand. Shapes

Clairton,Pa. C3 .....4.05
Fontana,Calif. K1 .....5.25
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 ....4.05
Lackawanna,N.Y. B2 ...4.05
Munhall,Pa. C3 .....4.05
So.Chicago,Ill. C3 .....4.05
Weirton,W.Va. W6 .....4.05

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..3.40
Aliquippa,Pa. J5 .....3.40
Ashland,Ky.(15) A10 ...3.40
Bessemer,Ala. T2 .....3.40
Clairton,Pa. C3 .....3.40
Claymont,Del. W16 ....3.50
Cleveland J5, R2 .....3.40
Coatesville,Pa. L7 .....3.50
Conshohocken,Pa. A3 ...3.50
Ecorse,Mich. G5 .....3.65
Fairfield,Ala. T2 .....3.40
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.40
Geneva,Utah G1 .....3.40
Harrisburg,Pa. C5 .....3.75
Houston,Tex. S5 .....3.80
Ind.Harbor,Ind. I-2, Y1.3.40
Johnstown,Pa. B2 .....3.40
Lackawanna,N.Y. B2 ..3.40
Minnequa,Colo. C10 ....4.30
Munhall,Pa. C3 .....3.40
Pittsburgh J5 .....3.40
Seattle B3 .....4.30
Sharon,Pa. S3 .....3.40
So.Chicago,Ill. C3, W14 .3.40
SparrowsPoint,Md. B2 ..3.40
Steubenville,O. W10 ....3.40
Warren,O. R2 .....3.40
Weirton,W.Va. W6 .....3.40
Youngstown C3, Y1 ....3.40

PLATES (Universal Mill)

Fontana,Calif. K1 .....4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 .....4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 .....5.40
Gary,Ind. C3 .....4.40
Johnstown,Pa. B2 .....4.40
Munhall,Pa. C3 .....4.40
Sharon,Pa. S3 .....4.40
So.Chicago,Ill. C3 .....4.40
SparrowsPoint,Md. B2 ..4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 ....3.65
Ashland,lcl(15) A10 ....4.15
Cleveland,cl R2 .....3.65
Warren,O.,cl R2 .....3.65

PLATES, Wrought Iron

Economy,Pa. B14 .....7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.20
Bessemer,Ala. T2 .....5.20
Clairton,Pa. C3 .....5.20
Cleveland J5, R2 .....5.20
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.45
Fairfield,Ala. T2 .....5.20
Fontana,Calif. K1 .....5.80
Gary,Ind. C3 .....5.20
Geneva,Utah G1 .....5.20
Houston,Tex. S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 .....5.20
Munhall,Pa. C3 .....5.20
Pittsburgh J5 .....5.20
Sharon,Pa. S3 .....5.65
So.Chicago,Ill. C3 .....5.20
SparrowsPoint,Md. B2 ..5.20
Warren,O. R2 .....5.20
Youngstown Y1 .....5.20

FLOOR PLATES

Cleveland J5 .....4.55
Conshohocken,Pa. A3 ...4.55
Harrisburg,Pa. C5 .....4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 .....4.55
So.Chicago,Ill. C3 .....4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ...3.35
Aliquippa,Pa. J5 .....3.35
Alton,Ill.(1) L1 .....3.35
Ashland,Ky. (17) A10 ..3.35
Atlanta,Ga. A11 .....3.50
Bessemer,Ala. T2 .....3.35
Buffalo R2 .....3.35
Canton,O. R2 .....3.35
Clairton,Pa. C3 .....3.35
Cleveland R2 .....3.35
Ecorse,Mich. G5 .....3.55
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1.3.35
Johnstown,Pa. B2 .....3.35
KansasCity,Mo. S5 .....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Marion,O. P11 .....3.35
Midland,Pa. C18 .....3.35
Milton,Pa. B6 .....3.35
Minnequa,Colo. C10 ....3.85
Niles,Calif. P1 .....4.05
N.Tonawanda,N.Y. B11 .3.35
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle B3, N14 .....4.10
S.Chicago C3, R2, W14..3.35
So.Duquesne,Pa. C3 ....3.35
S.SanFran.,Cal. B3 ....4.10
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Weirton,W.Va. W6 .....3.35
Youngstown C3, R2 ....3.35

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....3.35
Atlanta,Ga. A11 .....3.50
Bethlehem,Pa.(2) B2 ...3.55
Johnstown,Pa. B2 .....3.35
Lackawanna,N.Y. B2 ..3.35
Niles,Calif. P1 .....4.05
Pittsburgh(23) J5 .....3.35
Portland,Oreg. O4 .....4.10
SanFrancisco S7 .....4.05
Weirton,W.Va. W6 .....3.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....3.75
Buffalo R2 .....3.75
Canton,O. R2, T7 .....3.75
Clairton,Pa. C3 .....3.75
Ecorse,Mich. G5 .....4.05
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....3.75
Houston,Tex. S5 .....4.15
Ind.Harbor,Ind. I-2, Y1.3.75
Johnstown,Pa. B2 .....3.75
KansasCity,Mo. S5 .....4.35
Lackawanna,N.Y. B2 ..3.75
LosAngeles B3 .....4.80
Massillon,O. R2 .....3.75
Midland,Pa. C18 .....3.75
S.Chicago C3, R2, W14..3.75
So.Duquesne,Pa. C3 ....3.75
Struthers,O. Y1 .....3.75
Warren,O. C17 .....3.75
Youngstown C3 .....3.75

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 .....4.00
Fontana,Calif. K1 .....4.75
Gary,Ind. C3 .....4.00
Youngstown C3 .....4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 .....5.10
Bessemer,Ala. T2 .....5.10
Bethlehem,Pa. B2 .....5.10
Clairton,Pa. C3 .....5.10
Cleveland R2 .....5.10
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.10
Fontana,Calif. K1 .....6.15
Gary,Ind. C3 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
Pittsburgh J5 .....5.10
So.Duquesne,Pa. C3 ....5.10
Struthers,O. Y1 .....5.10
Youngstown C3 .....5.10

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 .....4.00
Ambridge,Pa. W18 .....4.00
BeaverFalls, M12, R2...4.00
Buffalo B5 .....4.00
Camden,N.J. P13 .....4.48
Carnegie,Pa. C12 .....4.00
Chicago W18 .....4.00
Cleveland A7, C20 .....4.00
Cumberland,Md. C19 ...3.95
Donora,Pa. A7 .....4.00
Ecorse,Mich. G5 .....4.30
Elyria,O. W8 .....4.00
FranklinPark,Ill. N5 ...4.00
Gary,Ind. R2 .....4.00
Hammond,Ind. L2, M13.4.00
Hartford,Conn. R2 .....4.40
Harvey,Ill. B5 .....4.00
Indianapolis M13 .....4.20
LosAngeles R2 .....5.40
Mansfield,Mass. B5 ....4.40
Massillon,O. R2, R8....4.00
Midland,Pa. C18 .....4.00
Monaca,Pa. S17 .....4.00
Newark,N.J. W18 .....4.40
Plymouth,Mich. P5 .....4.25
Pittsburgh J5 .....3.95
Putnam,Conn. W18 .....4.40
Readville,Mass. C14 ...4.40
St.Louis,Mo. M5 .....4.35
So.Chicago,Ill. W14 ....4.00
SpringCity,Pa.(5) K3 ..4.48
Struthers,O. Y1 .....4.00
Waukegan,Ill. A7 .....4.00
Youngstown F3, Y1.....4.00

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 .....4.65
Ambridge,Pa. W18 .....4.65
BeaverFalls,Pa. M12 ...4.65
Bethlehem,Pa. B2 .....4.65
Buffalo B5 .....4.65
Canton,O. R2, T7.....4.65
Carnegie,Pa. C12 .....4.65
Chicago W18 .....4.65
Cleveland A7, C20 .....4.65
Donora,Pa. A7 .....4.65
Elyria,O. W8 .....4.65
Gary,Ind. R2 .....4.65
Hammond,Ind. L2, M13.4.65
Hartford,Conn. R2 .....4.95
Harvey,Ill. B5 .....4.65
Indianapolis M13 .....4.85
Lackawanna,N.Y. B2 ..4.65
Mansfield, Mass. B5...4.95
Massillon,O. R2, R8....4.65
Midland,Pa. C18 .....4.65
Monaca,Pa. S17 .....4.65
Newark,N.J. W18 .....4.95
So.Chicago,Ill. R2, W14.4.65
Struthers,O. Y1 .....4.65
Waukegan,Ill. A7 .....4.65
Worcester,Mass. A7 ....4.95
Youngstown F3, Y1.....4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ..3.35
Alton,Ill.(6) L1 .....3.35
Atlanta,Ga. A11 .....3.50
Buffalo R2 .....3.35
Cleveland R2 .....3.35
Emeryville,Calif. J7 ....4.10
Fairfield,Ala. T2 .....3.35
Fontana,Calif. K1 .....4.00
Gary,Ind. C3 .....3.35
Houston,Tex. S5 .....3.75
Ind.Harbor,Ind. I-2, Y1 .3.35
Johnstown,Pa. B2 .....3.35
KansasCity, Mo. S5.....3.95
Lackawanna,N.Y. B2 ..3.35
LosAngeles B3 .....4.05
Minnequa,Colo. C10 ....4.25
Niles,Calif. P1 .....4.05
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 .....3.35
Portland,Oreg. O4 .....4.10
Seattle, Wash. B3, N14..4.10
So.Chicago,Ill. R2 .....3.35
So.Duquesne,Pa. C3 ....3.35
So.SanFrancisco B3 ....4.10
SparrowsPoint,Md. B2..3.35
Struthers,O. Y1 .....3.35
Torrance,Calif. C11 ....4.05
Youngstown C3, R2 ....3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 ..4.50
Johnstown,¼-1" B2 ....4.25
LosAngeles B3 .....5.00
Marion,O. P11 .....4.25
Pittsburgh J5 .....4.25
Seattle B3, N14 .....5.00
So.SanFrancisco B3 ...5.00
SparrowsPt.,1⅛-1¼" B2.4.83
SparrowsPt.,¼-1" B2 ..4.25

RAIL STEEL BARS

ChicagoHts.,Ill.(3) I-2 ..3.25
FortWorth,Tex.(4) T4 ..4.33
Hntngtn,W.Va.(3) W7 ..3.35
Moline,Ill.(3) R2 .....3.35
Williamsport(2,3) S19 ..3.35
Williamsport(4) S19 ...3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14..9.50
Economy,Pa.(D.R.)B14.11.00
Economy(Stablt) B14 ..11.30
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ....11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10 ...3.60

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 ..3.25
Ashland,Ky.(8) A10 ...3.25
Butler,Pa. A10 .....3.25
Cleveland J5, R2 .....3.25
Conshohocken,Pa. A3 ..3.35
Ecorse,Mich.(8) G5 ....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 .....4.15
Gary,Ind. C3 .....3.25
Ind.Harbor,Ind. I-2, Y1..3.25
Irvin,Pa. C3 .....3.25
Kokomo,Ind. C16 .....3.35
Lackawanna,N.Y. B2 ..3.25
Munhall,Pa. C3 .....3.25
Niles,O. M4 .....3.25
Pittsburg,Calif. C11 ....3.95
Pittsburgh J5 .....3.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
SparrowsPoint,Md. B2 ..3.25
Steubenville,O. W10 ....3.25
Torrance,Calif. C11 ....3.95
Warren,O. R2 .....3.25
Weirton,W.Va. W6 .....3.25
Youngstown C3, Y1 ....3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 ...4.40
Dover,O. R1 .....5.00
Fairfield,Ala. T2 .....4.15
Ind.Harbor,Ind. I-2 ....4.15
Kokomo,Ind. C16 .....4.25
Mansfield,O. E6 .....4.15
Niles,O. N12, M4 .....4.15
Torrance,Calif. C11 ....5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.00
Cleveland J5 R2 .....4.00
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.00
Follansbee,W.Va. F4 ...4.00
Fontana,Calif. K1 .....4.90
Gary,Ind. C3 .....4.00
GraniteCity,Ill. G4 .....4.20
Ind.Harbor,Ind. I-2, Y1.4.00
Irvin,Pa. C3 .....4.00
Lackawanna,N.Y. B2 ..4.00
Middletown,O. A10 ....4.00
Niles,O. M4 .....4.00
Pittsburg,Calif. C11 ...4.95
Pittsburgh J5 .....4.00
SparrowsPoint,Md. B2 ..4.00
Steubenville,O. W10 ....4.00
Warren,O. R2 .....4.00
Weirton,W.Va. W6 .....4.00
Youngstown Y1 .....4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 .....6.05
Ecorse,Mich. G5 .....6.25
Fontana,Calif. K1 .....6.95
Gary,Ind. C3 .....6.05
Ind.Harbor,Ind. I-2, Y1.6.05
Irvin,Pa. C3 .....6.05
Lackawanna,N.Y. B2 ..6.05
Pittsburgh J5 .....6.05
Sharon,Pa. S3 .....6.05
SparrowsPoint,Md. B2 ..6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 .....6.05
Youngstown Y1 .....6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	5.40
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance, Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, Zincgrip No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu FE
Ashland A10	5.00	...
Canton,O. R2	5.05	5.50
Fairfield,Ala. T-2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, Aluminized

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville, O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, Zincgrip No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.40
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill G4	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.25
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa, Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.25
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	
Sharon,Pa. S3	
Worcester,Mass. A7	
Youngstown C8	

STRIP, Cold-Rolled Carbo

Berea,O. C7	
Bridgeprt,Conn.(10) S1	
Butler,Pa. A10	
Chicago,Ill. T6	
Cleveland A7, J5	
Detroit, D2, D3	
Detroit M1	
Dover,O. G6	
Ecorse,Mich. G5	
Follansbee,W.Va. F4	
Fontana,Calif. K1	
Ind.Harbor,Ind. I-2	
Lackawanna,N.Y. B2	
LosAngeles C1	
Mattapan,Mass.(21) T	
Middletown,O. A10	
NewBritain(10) S15	
NewCastle,Pa. B4, E5	
NewHaven,Conn. A7, D	
NewKensington,Pa. A6	
NewYork W3	
Pawtucket,R.I.(11) N8	
Pawtucket,R.I.(21) N8	
Pawtucket,R.I. R3	
Pittsburgh J5	
Riverdale,Ill. A1	
Sharon,Pa. S3	
SparrowsPoint,Md. B2	
Trenton,N.J.(13) R5	
Wallingford,Conn. W2	
Warren,O. R2, T5	
Weirton,W.Va. W6	
Youngstown C8, Y1	

STRIP, Cold-Rolled, High-strength Low-Allo

Cleveland A7, J5	
Dover,O. G6	
Ecorse,Mich. G5	
Fontana,Calif. K1	
Lackawanna,N.Y. B2	
Pittsburgh J5	
Sharon,Pa. S3	
SparrowsPoint,Md. B2	
Warren,O. R2	
Weirton,W.Va. W6	
Youngstown Y1	

STRIP, Electro Galvanize

Weirton,W.Va. W6	
Youngstown C8	

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	...	5.95	6.70	7.50
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	5.15	5.45	5.95	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	5.45	5.95	6.70	7.50
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O, R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	8.05	8.60	9.30	10.10
Toronto,O. F4	8.05	8.60	9.30	10.10
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40c	0.40-0.60c	0.60-0.80c	0.80-1.05c
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05
Bristol,Conn. W1	...	...	6.40	8.35
Carnegie,Pa. S18	...	5.50	6.10	8.05
Chicago T6	4.25	5.65	6.25	8.20
Cleveland A7	4.00	5.50	6.10	8.05
Dover,O. G6	4.00	5.50	6.10	7.85
Harrison,N.J. C18	...	...	6.40	8.35
Mattapan,Mass. T6	4.50	5.80	6.40	8.35
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05
NewCastle,Pa. B4	4.00	5.50	6.10	...
NewYork W3	...	5.80	6.40	8.35
Pawtucket,R.I. N8				
Cleve.orPitts.Base	4.55	5.50	6.10	8.05
Worcester,Mass.Base	4.50	5.80	6.40	8.35
Sharon,Pa. S3	4.00	5.50	6.10	8.05
Trenton,N.J. R5	...	6.30	6.90	8.85
Union,N.J. H6	4.40	6.35	6.35	8.30
Wallingford,Conn. W2	4.50	5.80	6.40	8.05
Weirton,W.Va. W6	4.00	5.50	6.10	8.05
Worcester,Mass. A7	4.30	5.80	6.40	8.35
Worcester,Mass, T6	4.50	5.80	6.40	8.35
Youngstown C8	4.50	5.50	6.10	8.05

Key to Producing Companies

A1	Acme Steel Co.	C10	Colorado Fuel & Iron	G3	Globe Steel Tubes C
A3	Alan Wood Steel Co.	C11	Columbia Steel Co.	G4	Granite City Steel C
A4	Allegheny Ludlum Steel	C12	Col. Steel & Shafting Co.	G5	Great Lakes Steel C
A6	American Shim Steel Co.	C13	Columbia Tool Steel Co.	G6	Greer Steel Co.
A7	American Steel & Wire	C14	Compressed Steel Shaft.	H1	Hanna Furnace Co
A8	Anchor Drawn Steel Co.	C16	Continental Steel Corp.	H4	Heppenstall Co.
A9	Angell Nail & Chaplet	C17	Copperweld Steel Co.	H6	Hind Steel Co.Inc.
A10	Armco Steel Corp.	C18	Crucible Steel Co.	I-1	Igoe Bros.Inc.
A11	Atlantic Steel Co.	C19	Cumberland Steel Co.	I-2	Inland Steel Co.
A13	American Cladmetals Co.	C20	Cuyahoga Steel & Wire	I-3	Interlake Iron Corp
B1	Babcock & Wilcox Tube	D2	Detroit Steel Corp.	I-4	Ingersoll Steel Div. Borg-Warner Cor
B2	Bethlehem Steel Co.	D3	Detroit Tube & Steel Co.	J1	Jackson Iron & Ste
B3	Beth. Pac. Coast Steel	D4	Disston & Sons,Henry	J3	Jessop Steel Co.
B4	Blair Strip Steel Co.	D6	Driver Harris Co.	J4	Johnson Steel & Wi
B5	Bliss & Laughlin Inc.	E1	Eastrn.Gas&Fuel Assoc.	J5	Jones & Laughlin S
B6	Boiardi Steel Corp.	E2	Eastern Stainless Steel	J6	Joslyn Mfg. & Supp
B8	Braeburn Alloy Steel	E4	Electro Metallurgical Co.	J7	Judson Steel Corp.
B11	Buffalo Bolt Co.	E5	Elliot Bros. Steel Co.	K1	Kaiser Steel Corp.
B14	A. M. Byers Co.	E6	Empire Steel Co.	K2	Keokuk Electro-Me
C1	Calif. Cold-Rolled Steel	F2	Firth Sterling Steel	K3	Keystone Drawn St
C3	Carnegie-Illinois Steel	F3	Fitzsimons Steel Co.	K4	Keystone Steel & W
C4	Carpenter Steel Co.	F4	Follansbee Steel Corp.	K5	Kidd Drawn Steel
C5	Central Iron & Steel Div. Barium Steel Corp.	F6	Fretz-Moon Tube Co.	L1	Laclede Steel Co.
C7	Cleve.Cld.Roll.MillsCo.	G1	Geneva Steel Co.	L2	LaSalle Steel Co.
C8	Cold Metal Products Co.	G2	Globe Iron Co.	L3	Latrobe Electric St
C9	Colonial Steel Co.			L5	Lockhart Iron & St

IP, Hot-Rolled, High-Strength Low-Alloy

essemer,Ala. T2	4.95
veland J5	4.95
rse,Mich. G5	5.15
rfield,Ala. T2	4.95
tana,Cal. K1	6.64
ty,Ind. C3	4.95
Harb.,Ind. I-2, Y1	4.95
kawanna,N.Y. B2	4.95
sburgh J5	4.95
ron,Pa. S3	4.95
rrowsPoint,Md. B2	4.95
ren,O. R2	4.95
rton,W.Va. W6	4.95
ngstown C3, Y1	4.95

HT COOPERAGE HOOP

anta A11	3.60
erdale,Ill. A1	3.60
ron,Pa. S3	3.60
ngstown C3	3.60

E, Cold-Rolled Flat

cago T6	5.35
veland A7	5.00
er,O. G6	5.00
toria,O. S1	5.50
omo,Ind. C16	5.00
ssillon,O. R8	5.00
nessen,Pa. P7	5.00
tucket,R.I. (11) N8	5.55
tucket,R.I. (12) N8	5.50
nton,N.J. R5	5.80
rcester,Mass. A7	5.30
rcester,Mass. T6	5.30

E, Fine and Weaving (8-in. Coils)

tonville,Ill. (19) K4	7.70
cago W13	7.70
veland A7	7.70
toria,O. S1	8.20
nstown,Pa. B2	7.70
omo,Ind. C16	7.70
smouth,O. P12	7.70
thers,O. Y1	7.70
nton,N.J. R5	8.50
kegan,Ill. A7	7.70
rcester, Mass. A7, T6	8.00

E (16 gage)	An'ld. Stone	Galv. Stone
quippa J5	9.05	10.55
nvill (19) K4	9.05	10.55
eland A7	9.05	10.55
toria,O. S1	9.15	10.65
nstown B2	9.05	10.55
omo C16	9.05	10.10
nequa C10	9.40	10.90
s.,Cal. C11	9.40	10.90
mth.(18) P12	9.05	10.55
SparrowsPt. B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill. (1) L1	4.15
Bartonville,Ill. (1) K4	4.15
Buffalo W12	4.15
Chicago W13	4.15
Cleveland A7, C20	4.15
Crawfrdsvll,Ind. M8	4.30
Donora,Pa. A7	4.15
Duluth A7	4.15
Fairfield,Ala. T2	4.15
Fostoria,O.(24) S1	*4.65*
Houston S5	4.55
Johnstown,Pa. B2	4.15
Joliet,Ill. A7	4.15
KansasCity,Mo. S5	4.75
Kokomo,Ind. C16	4.25
LosAngeles B3	5.10
Minnequa,Colo. C10	4.50
Monessen,Pa. P7	4.15
Newark,6-8ga. I-1	4.75
No.Tonawanda B11	4.18
Palmer,Mass. W12	4.45
Pittsburg,Calif. C11	5.10
Portsmouth,O. P12	4.15
Rankin,Pa. A7	4.15
So.Chicago,Ill. R2	4.15
So.SanFrancisco C10	5.10
SparrowsPoint,Md. B2	4.25
Sterling,Ill. (1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	5.10
Waukegan,Ill. A7	4.15
Worcester,Mass. A7, T6	4.45

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	5.55
Alton,Ill. (1) L1	5.55
Bartonville,Ill. (19) K4	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Fostoria,O. S1	6.05
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Milbury,Mass. (12) N6	5.85
Monessen,Pa. P7	5.55
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Trenton,N.J. A7	5.85
Trenton,N.J. R5	6.35
Waukegan,Ill. A7	5.55
Worcester A7,J4,T6,W12	5.85

RE WIRE	Mild Plow	Plow	Imp. Plow
tonville,Ill. K4	7.10	7.40	7.80
eland A7	7.50	7.80	8.20
ora,Pa. A7	7.50	7.80	8.20
oria,O. S1	8.00	8.30	8.70
nstown,Pa. B2	7.50	7.80	8.20
essen,Pa. P7	7.50	7.80	8.20
Haven,Conn. A7	7.80	8.10	8.50
smouth,O. P12	7.50	7.80	8.20
rrowsPoint,Md. B2	7.60	7.90	8.30
thers,O. Y1	7.50	7.80	8.20
nton,N.J. A7	7.80	8.10	8.50
nton,N.J. R5	8.00	8.30	8.70
kegan,Ill. A7	7.50	7.80	8.20
amsport,Pa. B2	7.60	7.90	8.30
rcester,Mass. J4	7.50	7.80	8.20

WIRE, Merchant Quality (6 to 8 gage)

	An'ld.	Galv.
Ala.,City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Cleveland A7	4.80	5.25
Crawfrdvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Pitts.,Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1)N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.20
Alton,Ill. (1) L1	5.20
Cleveland A7	5.20
Donora, Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
LosAngeles B3	6.15
NewHaven,Conn. A7	5.50
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Struthers,O. Y1	5.20
Torrance,Calif. C11	6.15
Trenton,N.J. A7	5.50
Waukegan,Ill. A7	5.20
Worcester,Mass. A7	5.50

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	143
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

FENCE POSTS

	Col.
Duluth A7	112
Huntington,W.Va. W7	112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19..n.t.	$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2	175
AlabamaCity,Ala. R2	109
Aliquip.,Pa 9-14½ga. J5	109
Atlanta A11	111
Bartonville,Ill.(19) K4	109
Crawfordsvll,Ind. M8	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga.,6" B2	183
Johnstn,17ga.,4" B2	186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12	109
Rankin, Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	106
Atlanta A11	107
Bartonville,Ill.(19) K4	106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	106
So.Chicago,Ill. R2	106
So.SanFran., Calif. C10	130
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Stock (To Dealers & Mfrs.)

AlabamaCity,Ala. R2	103
Aliquippa,Pa. J5	103
Atlanta A11	105
Bartonville,Ill.(19) K4	103
Cleveland A9	110
Crawfordsvile M8	106
Donora,Pa. A7	103
Duluth A7	103
Fairfield,Ala. T2	103
Houston,Tex. S5	111
Johnstown,Pa. B2	103
Joliet,Ill. A7	103
KansasCity,Mo. S5	115
Kokomo,Ind. C16	105
Minnequa,Colo. C10	110
Monessen,Pa. P7	103
Pittsburg,Calif. C11	122
Portsmouth,O. P12	103
Rankin,Pa. A7	103
So.Chicago,Ill. R2	103
SparrowsPoint,Md. B2	105
Sterling,Ill.(1) N15	103
Torrance,Calif. C11	123
Worcester,Mass. A7	109

NAILS & STAPLES, Stock (To Jobbers)

Chicago,Ill. V13	103
Minnequa,Colo. C10	107
Portsmouth,O. P12	100

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.20
Bartonville,Ill.(19) K4	5.20
Donora,Pa. A7	5.20
Duluth A7	5.20
Johnstown,Pa. B2	5.20
Joliet,Ill. A7	5.20
Kokomo,Ind. C16	5.30
Minnequa,Colo. C10	5.55
Pittsburg,Calif. C11	6.15
Portsmouth,O. P12	5.20
Rankin,Pa. A7	5.20
So.Chicago,Ill. R2	5.20
SparrowsPoint,Md. B2	5.30
Worcester,Mass. A7	5.50

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.20
Gary,Ind. C3	5.20
Ind.Harbor,Ind. S13	5.20
Johnstown,Pa. B2	5.20
McKeesRocks,Pa. C3	5.20

TIE PLATES

Fairfield,Ala. T2	4.05
Gary,Ind. C3	4.05
Ind.Harbor,Ind. I-2	4.05
Lackawanna,N.Y. B2	4.05
Minnequa,Colo. C10	4.05
Pittsburg,Calif. C11	4.20
Pittsburgh R2	4.05
Seattle B3	4.50
Steelton,Pa. B2	4.05
Torrance,Calif. C11	4.20
Weirton,W.Va. W6	4.05

JOINT BARS

Bessemer,Pa. C3	4.25
Fairfield,Ala. T2	4.25
Ind.Harbor,Ind. I-2	4.25
Joliet,Ill. C3	4.25
Lackawanna,N.Y. B2	4.25
Minnequa,Colo. C10	4.25
Steelton,Pa. B2	4.25

TRACK BOLTS

	(20)Treated
Fairfield,Ala. T2	8.50
Lebanon,Pa. B2	8.50
Minnequa,Colo. C10	8.25
Pittsburgh,Pa. O3, P14	8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.35
Ind.Harbor,Ind. I-2, Y1	5.35
Kansas City, Mo. S5	5.60
Lebanon,Pa. B2	5.35
Minnequa,Colo. C10	5.35
Pittsburgh J5	5.35
So.Chicago,Ill. R2	5.35
Struthers,O. Y1	5.35
Youngstown R2	5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7	3.55
Williamsport,Pa. S19	3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W,4Cr,3V	114.50
Extra Carbon	22.00	18W,4Cr,2V,9Co	168.50
Spec. Carbon	26.50	18W,4Cr,2V,6Co	154.00
Oil Hardening	29.00	18.25W,4.25Cr,1V,4.75Co	142.00
Hi.-Carbon-Cr	52.00	20.25W,4.25Cr,1.6V,12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W,4Cr,1V,8.5Mo	65.00
18W,4Cr,1V	90.50	6.4W,4.5Cr,1.9V,5Mo	69.50
18W,4Cr,2V	102.50	6W,4Cr,3V,6Mo	88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(8) 16 gage and heavier.
(9) 6" and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.

Key to Producing Companies

Lone Star Steel Co.	P11 Pollak Steel Co.	T3 Tenn. Prod. & Chem.
ukens Steel Co.	P12 Portsmouth Steel Corp.	T4 Texas Steel Co.
McLouth Steel Corp.	P13 Precision Drawn Steel	T5 Thomas Steel Co.
Mahoning Valley Steel	P14 Pitts. Screw & Bolt Co.	T6 Thompson Wire Co.
Medart Co.	P15 Pittsburgh Metallurgical	T7 Timken Roller Bearing
Mercer Tube & Mfg. Co.	P16 Page Steel & Wire Div., Amer. Chain & Cable	T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
Mid-States Steel & Wire		
Midvale Co.	R1 Reeves Steel & Mfg. Co.	U4 Universal-Cyclops Steel
Missouri-Illinois Furnace	R2 Republic Steel Corp.	V2 Vanadium-Alloys Steel
Moltrup Steel Products	R3 Rhode Island Steel Corp.	V3 Vulcan Crucible Steel Co.
Monarch Steel Co.	R5 Roebling's Sons, John A.	
National Supply Co.	R7 Rotary Electric Steel Co.	W1 Wallace Barnes Co.
National Tube Co.	R8 Reliance Div., Eaton Mfg.	W2 Wallingford Steel Co.
Nelsen Steel & Wire Co.	S1 Seneca Wire & Mfg. Co.	W3 Washburn Wire Co.
New Eng.High Carb.Wire	S3 Sharon Steel Corp.	W4 Washington Steel Corp.
Newman-Crosby Steel	S5 Sheffield Steel Corp.	W6 Weirton Steel Corp.
Niles Rolling Mill Co.	S6 Shenango Furnace Co.	W7 W. Va. Steel & Mfg. Co.
Northwst. Steel Roll. Mills	S7 Simmons Co.	W8 Wstrn.Auto.Mach.Screw
Northwestern S.&W. Co.	S8 Simonds Saw & Steel Co.	W9 Wheatland Tube Co.
New Delphos Mfg. Co.	S9 Sloss-Sheffield S.&I. Co.	W10 Wheeling Steel Corp.
Inland Iron & Steel Corp.	S13 Standard Forgings Corp.	W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
Oregon Steel Mills	S14 Standard Tube Co.	
Pacific States Steel Corp.	S15 Stanley Works	W13 Wilson Steel & Wire Co.
Pacific Tube Co.	S16 Struthers Iron & Steel	W14 Wisconsin Steel Co.
Pilgrim Drawn Steel	S17 Superior Drawn Steel Co.	W15 Woodward Iron Co.
Pittsburgh Coke & Chem.	S18 Superior Steel Corp.	W16 Worth Steel Co.
Pittsburgh Steel Co.	S19 Sweet's Steel Co.	W18 Wyckoff Steel Co.
Pittsburgh Tube Co.	T2 Tenn. Coal, Iron & R.R.	Y1 Youngstwn. Sheet & Tube

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3".

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ½" through 3" only; Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 in., inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10% Both Sides		—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
Stainless 302	....	....	....	....	19.75	21.50	75.00
304	22.50	26.50	....	....	20.75	22.50	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized, † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long	35
5/16 & ⅜ x 6 in., shorter	37
½-in. & larger x 6 in., shorter	34
All diameters longer than 6-in.	30
Tire bolts	25
Plow bolts	47
Lag bolts, 6 in., shorter	37
Lag bolts, longer than 6 in.	35

NUTS

	A.S. Reg. & Light	Heavy
Semifinished hexagon 7/16-in., smaller	41 off	.....
½-in., smaller	....	38 off
½-in.-1-in.	39 off	.....
9/16-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in., larger	34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller.51 off
¾, ⅞, & 1 x 6-in. & shorter .....35 off
Headless, ¼-in., larger.31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
7/16-in., under .....48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam. Inches	Length Inches	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	84,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	37.50	30.50	28.50
302	37.50	33.00	28.50
303	39.50	36.50	31.00
304	39.50	35.00	30.00
309	52.00	52.00	41.50
316	53.00	55.00	46.00
321	45.50	44.50	34.00
347	50.00	48.50	38.50
410	33.00	27.00	23.00
416	33.50	33.50	23.50
420	40.50	43.50	28.50
430	35.50	27.50	23.50
501	24.00	22.50	11.50
502	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.

Butler, Pa., sheets and strip except Types 309, 501 & 502 A10.

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.

Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.

Detroit, strip, except Type 309 M1.

Dunkirk, N. Y., bars, wire A4.

Duquesne, Pa., bars C3.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.

McKeesport, Pa., bars; sheets except Type 416, C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip, except Types 501 and 502 and except 309 strip quoted 51.00c A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.

So. Chicago, Ind., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2.

Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309; 316 sheets 58.00c strip 60.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, except Type 309 quoted 51.00 A4.

Youngstown, strip C8.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 20.00
Toluol, one deg...19.00-23.50
Industrial xylol ..20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia..$45.00

Per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

ORES

LAKE SUPERIOR IRON OR

Gross ton, 51½% (natura lower lake ports. Any crease or decrease in R. freight rates, dock handli charges and taxes there are for buyer's account.
Old range bessemer ...$7
Old range nonbessemer..7
Mesabi bessemer 7
Mesabi nonbessemer ...7
High phosphorus 7

EASTERN LOCAL ORE

Cents, unit, del. E. Pa.
Foundry and basic 56.62%
concentrates, contract.16

FOREIGN ORE

Cents per unit, c.i.f. Atl tic ports
Swedish basic, 60 to 68%
Spot: 17
Long-term contract..15
Brazil iron ore, 68-69%.18

TUNGSTEN ORE

Wolframite, scheelite, ne ton unit, duty pd..$20-

MANGANESE ORE

Long term contracts, n inal; nearby, 48%, d paid, 81.8c-83.8c per long unit, c.i.f. U. S. ports; pr on lower grades adjusted Mn content and impuriti

CHROME ORE

Gross ton f.o.b. cars, York, Philadelphia, B more, Charleston, S. C., ocean freight differential delivery to Portland, Or or Tacoma, Wash.
Indian and African
48% 2.8:1 .....$3
48% 3:1 3
48% no ratio 28.50-2
South African Transvaal
44% no ratio....$19.00-2
45% no ratio ...19.50-2
48% no ratio 27.00-2
50% no ratio.....28.50-2
Brazilian
44% 2.5:1 lump.....$3
Rhodesian
45% no ratio....$20.00-2
48% no ratio 28.00-2
48% 3:1 lump 3
Domestic—rail nearest se
48% 3:1 .....$3

MOLYBDENUM

Sulphide conc., lb, Mo, cont. Mines .....$

METALLURGICAL CO

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur. $13.00-1
Connellsvll, fdry 15.50-1
New River, foundry....1
Wise county, foundry..1
Wise county, furnace..1

OVEN FOUNDRY COKE

Kearny, N. J., ovens.$2
Everett, Mass., ovens ...
New England, del.‡..2
Chicago, ovens 2
Chicago, del. .....†2
Detroit, del. 2
Terre Haute, ovens....2
Milwaukee, ovens 2
Indianapolis, ovens....1
Chicago, del. 2
Cincinnati, del. 2
Detroit, del. 2
Ironton, O., ovens 1
Cincinnati, del. 2
Painesville, O., ovens..2
Buffalo, del. 2
Cleveland, del. 2
Erie, del. 2
Birmingham, ovens 1
Philadelphia, ovens 2
Swedeland, Pa., ovens.2
Portsmouth, O., ovens.1
Detroit, ovens 2
Detroit, del. *2
Buffalo, del. 2
Flint, del. 2
Pontiac, del. 2
Saginaw, del. 2

Includes represe tive switching charge *, $1.05; †, $1.45, one-t charge being $1.20, tracks $1.40, and three more tracks $1.50, within $4.03 freight from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
v York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
v York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
ton (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
ton (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
a. (city)...	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
a. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
folk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
h. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
'alo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
'alo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
's. (w'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
roit (w'hse).	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
'eland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
e. (w'hse) .	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
in. (w'hse).	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
ago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[6]	5.10	5.30	6.75
ago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[6]	4.90	5.10	6.55
raukee (city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
vau. (c'try).	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
n'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
n'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
ha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
A. (w'hse)..	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
Francisco..	6.15[10]	7.50[3]	7.80	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
tle-Tacoma.	6.70[7]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage a excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-hed bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2] 1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; 000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

r Duty: St. Louis, Vandalia, Farber, lco, Mo., Olive Hill, Ky., Clearfield, or vensville, Pa., Ottawa, Ill., $100. Hard-, $135 at above points.

-heat Duty: Salina, Pa. $85; Woodbridge, J., St. Louis, Farber, Vandalia, Mexico, West Decatur, Orviston, Clearfield, Beach k, or Curwensville, Pa., Olive Hill, hins, Haldeman, or Ashland, Ky., Troup, thens, Tex., Stevens Pottery, Ga., Ports-th, or Oak Hill, O., Ottawa, Ill., $80.

mediate-Heat Duty: St. Louis, or Van-a, Mo., West Decatur, Orviston, Beach k, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ky., Athens, or Troup, Tex., ens Pottery, Ga., Portsmouth, O., Ottawa, $74.

-Heat Duty: Oak Hill, or Portsmouth, O., rfield, Orviston, Pa., Bessemer, Ala., Ot-, Ill., $66.

LADLE BRICK

Press: $55, Freeport, Merill Station, rfield, Pa., Chester, New Cumberland, Va.; Irondale, Wellsville, O.

Cut: $53, Chester, New Cumberland, Va.; Wellsville, O.

MALLEABLE BUNG BRICK

Louis, Mo., Olive Hill, Ky., Ottawa, Ill., Beach Creek, Pa., $80.

SILICA BRICK

Union, Claysburg, or Sproul, Pa., Ensley, $80; Hays, Pa., $85; Joliet or Rockdale, E. Chicago, Ind., $89; Lehi, Utah, Los les, $95.

ern Silica Coke Oven Shapes: Claysburg, Union, Sproul, Pa., Birmingham, $80.

is Silica Coke Oven Shapes: Joliet or dale, Ill., E. Chicago, Ind., Hays, Pa., $

BASIC BRICK

e prices per net ton; f.o.b. works, Balti-more or Chester, Pa.)

ed chrome brick, $66; Chemical-bonded ne brick, $69; magnesite brick, $91; ical-bonded magnesite, $80.

MAGNESITE

Base prices per net ton, f.o.b. works, Chewelah, Wash.)

estic dead-burned, ⅜" grains; Bulk, 0-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

estic, dead-burned bulk; Billmeyer, Blue Williams, Plymouth Meeting, Pa., Mill-W. Va., Narlo, Millersville, Martin, nburg, Woodville, O., $12.25; Thornton, k, Ill., $12.35; Dolly Siding, Bonne . Mo., $12.45

LEADING FERROALLOY PRODUCTS

Manganese Alloys

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

(*Please turn to page* 160)

Lead Price Trend Turns Downward

Leading custom smelter intiates decline with ¼-cent reduction, effective Nov. 10. Copper and zinc demand continues heavy at established higher levels

New York—Price of lead was reduced ¼-cent a pound by a leading custom smelter to the basis of 12.55c, St. Louis, for the common grade, effective Nov. 10. This is the first break in the lead price since Oct. 14 when the quotation was lowered ¾-cent a pound. After selling at a record high of 21.30c to 21.35c, St. Louis, up to Mar. 8, the buyers' strike in nonferrous metals forced the price down to a low of 13.85c on May 9. It had recovered to 14.92½c by Aug. 18 and had held at that level until Sept. 26 when the downtrend was resumed.

Easiness in the market is attributable to lack of domestic buying interest coupled with continued offerings of foreign metal, chiefly of Yugoslavian and Japanese origin, at price concessions from the United States sellers' quotation.

Advances in electrolytic copper to the 18.50-cent level and in zinc to the 10-cent level have stimulated buying interest in these metals, rather than dim them, as consumers press for coverage as protection against further upward price adjustments. Straits tin also has advanced, now being quoted 94.50c for prompt delivery, but only small tonnages are being booked.

Prospects for a high rate of activity in the metalworking industries over the balance of this year and probably well into the first quarter of next year were heightened by the progress made toward restoring normal operations in the steel industry as well as by the truce reached in the coal dispute. Producers of galvanized products and tin plate are expected to re-enter the zinc and tin markets soon for additional coverage.

Copper — Leading mine producers are booked up solidly on metal for delivery over the balance of this year and, since they have not opened books for January business, an extremely tight supply situation has developed. Custom smelters are having no difficulty, of course, in disposing of their daily intake and are attempting to make equitable distribution among their customers.

With electrolytic at 18.50c, delivered Connecticut, the market is at the highest level since May 7 and compares with a range of 23.25c to 23.50c quoted in the first quarter of this year. Following the advance in the primary market on Nov. 3, brass mills made upward adjustments in their price schedules, effective Nov. 5. Wire mills raised their prices ⅞-cent a pound on bare and magnet wire and 0.657 cents a pound on weatherproof wire. The upward push on prices also extended to the brass and bronze ingot industry as well as to scrap material.

Reports received in the trade here from Washington reveal the British Ministry of Supply will purchase copper in 1950 on a competitive bid basis instead of by negotiations as in the past. Purchases on a negotiated contract basis have ranged up to 20,000 tons per quarter.

Zinc—The price of zinc advanced ¼-cent a pound on Wednesday to the basis of 10.00c for prime western. This action returns the market to the level prevailing before the steel mills were closed by a strike. With settlement of the steel strike by a number of the large producers, the steelmakers have returned to the market for zinc in increasing volume. Inquiry for zinc from this source has been particularly heavy during the last few days. One of the factors in the upswing in zinc prices from the 9.25-cent level which prevailed from Oct. 3 to Oct. 26 is the loss of production due to strikes.

Upward revision in prices was made in the face of unfavorable statistical showing for October. In that month domestic deliveries fell off about 16,200 tons to 43,998 tons. Shipments on government account held at 5955 tons against 6027 tons in September, while there was a decrease in shipments on export and drawback to about 1800 tons from 3830 tons. Total deliveries came to only 51,761 tons compared with 70,077 tons in September and 67,402 tons in October, 1948.

Smelter production of slab zinc declined to 64,399 tons in October from 70,392 tons in September. This decline in output was smaller than had been expected in view of the stoppage of operations at important plants, including those at Palmerton, Pa., smelter of New Jersey Zinc Co., the Donora smelter of American Steel & Wire Co., and the Bunker Hill smelter in Idaho.

Stocks of slab zinc at smelters increased about 12,600 tons to a total of 97,841 tons as of Oct. 1 compared with 85,203 tons on Sept. 30.

Lead — While buying in the lead market has been light, sales for delivery this month will show a substantial gain over the October volume. Total stocks of lead held by smelters and refiners as of Oct. 1 totaled 202,791 tons compared with 207,108 tons on Sept. 1, reports the American Bureau of Metal Statistics. Although stocks of refined lead dropped sharply to 50,184 tons from 65,414 tons a month earlier, the decline was offset by gains in stocks in ore and matte and in base bullion at smelteries and refineries. Stocks in ore and matte were up about 8500 tons to 100,477 tons, while the amount in base bullion at smelteries and refineries increased to 19,122 tons from 17,173 tons on Sept. 1.

Imports of refined lead during the first nine months of this year amounted to 197,292 tons, an increase of 33,300 tons from the like 1948 period. Imports in September dropped to 18,626 tons from 29,794 tons in August.

Tin—Interest in the tin trade here centers on preparation for resumption of trading on the London Metal Exchange Nov. 15. As the British Ministry of Supply is expected t the sole holder of tin in England w trading is resumed, it will be i position to set the spot price. T ers forecast that the Ministry sell its holdings of Straits tin at price established in the Singa market which reopens Nov. 16. the interim, the Ministry's off prices are expected to hold at equivalent of 95.00c, f.o.b. New Y for Straits and 94.50c for English fined.

The domestic market is irreg with Straits quoted 94.50c for pro delivery. Buying remains light this level.

Kaiser Aluminum & Chemical

Oakland, Calif.—Directors of manente Metals Corp., this city, voted to change the name of the c pany to Kaiser Aluminum & Chem Corp., a Delaware corporation.

Henry Kaiser, president, rep that the company's aluminum or this month are headed for an all- record and that October shipm were the largest for any mont the company's history.

Gets Aluminum Railing Order

Seattle—Seidelhuber Iron & Br Works, this city, is low at $195 for furnishing 5600 lineal feet aluminum railing for the crest Grand Coulee dam.

Copper and Gold Output Gain

Washington — Copper produc in this country increased 5 per in September over August output, ports the Bureau of Mines. Gold duction increased 2 per cent while ver output declined 24 per cent.

Copper production for Septen was 58,379 tons, of which Ariz produced 26,065 and Utah 17,220

Gold production totaled 188 ounces, including 44,482 from S Dakota, 33,301 from California, 143 from Alaska and 29,245 f Utah.

The bureau said the sharp dro silver output was due almost enti to a 71 per cent decline in Id caused by the Aug. 20 shutdow the Bunker Hill smelter at Kell

Silver output totaled 2,224 ounces, including 580,000 from U 425,000 from Montana, 366,000 f Arizona, 280,000 from Idaho, 279 from Colorado and 161,104 from vada.

Secondary Zinc Production

Washington—Recovery of seco ary zinc in all zinc-base products clined 22 per cent in July, rep Bureau of Mines. Total recovery reported by zinc scrap consumers 8026 tons compared with 10,262 t in June. Consumption of all type zinc scrap decreased with the exc tion of die-cast skimmings and and die scrap. Treatment of gal izers' dross, chemical residues, dust and skimmings and ashes creased 1017 tons, 998 tons, 611 t and 588 tons, respectively.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

rimary Metals

pper: Electrolytic 18.50c, Conn. Valley, ke, 18.62½c, Conn. Valley.

ass Ingot: 85-5-5-5 (No. 115) 17.75-18.25c; 10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 75c; No. 1 yellow (No. 405) 14.75-16.00c.

c: Prime western 10.00c, brass special 25c, intermediate 10.50c, East St. Louis; h grade 11.00c, delivered.

ad: Common 12.55c; chemical nominal; cor- ing nominal, St. Louis.

mary Aluminum: 99% plus, ingots 17.00c, s 16.00c. Base prices for 10,000 lb and r, f.o.b. shipping point.

ondary Aluminum: Piston alloys 16.50- 00c; No. 12 foundry alloy (No. 2 grade) 75-16.50c; steel deoxidizing grades, notch s, granulated or shot: Grade 1, 17.75-18.25c; de 2, 16.75-17.25c; grade 3, 15.50-16.25c; de 4, 14.75-15.75c. Prices include freight carload rate up to 75 cents per 100 lb.

titanium-aluminum alloy No. 1 (low Cu) 00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddy- ne, Pa.

gnesium: Commercially pure (99.8%) stand- ingots, 10,000 lb and over, 20.50c, f.o.b. eport, Tex.

: Straits, prompt, 94.50c, New York; Grade prompt delivery, 93.50c; November arrival 00c. Chinese, 99% tin, prompt delivery 00c; November arrival, 84.00c.

FC selling prices for prompt delivery, ex- k New York or f.o.b. Texas City, Tex.: de A, 99.8% or higher (including Straits) 00c; Grade B, 99.8% or higher, not meet- specs. for Grade A, with 0.05% max. enic, 94.80c; Grade C, 99.65-99.79%, incl., 40c; Grade D, 99.5-99.649%, 94.40c; Grade 99-99.499%, 94.00c; Grade F, 98-98.999%, 50c; Grade G, 95-97.999%, 91.00c. Prices grade D through Grade G are for tin tent.

imony: American 99-99.8% and over but meeting specifications below, 32.00c; 99.8% over (arsenic 0.05% max.; other impuri- 0.1% max.) 32.50c; f.o.b. Laredo, Tex., bulk shipments. Foreign, 99% (Chinese, glish, Belgium), prompt, 26.00c, New York.

kel: Electrolytic cathodes, 99.9%, base sizes refinery, unpacked, 40.00c; 25-lb pigs, 0c; "XX" nickel shot, 43.50c; "F" nickel or ingots, for addition to cast iron, 0c. Prices include import duty.

cury: Open market, spot, New York $73- per 76-lb flask.

yllium-Copper: 3.75-4.25% Be, $24.50 per ontained Be.

mium: "Regular" straight or flat forms, del.; special or patented shapes, $2.15.

alt: 97-98%, $1.80 per lb for 550 lb (keg); 2 per lb for 100 lb (case); $1.87 per lb er 100 lb.

d: U. S. Treasury, $35 per ounce.

er: Open market, New York, 73.25c per oz.

dium: $69-72 per ounce.

adium: $24 per troy ounce.

ium: $100-$110 per troy ounce.

nium (sponge form): $5 per pound.

lled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

et: Copper 32.18; yellow brass 28.69; com- cial bronze, 95% 32.10; 90%, 31.61; red s, 85%, 30.60; 80%, 30.12; best quality, 8; nickel silver, 18%, 42.27; phosphor- ze, grade A, 5% 50.90.

s: Copper, hot-rolled 28.03; cold-drawn 8; yellow brass free cutting, 23.19; com- cial bronze, 95% 31.79; 90% 31.30; red s 85% 30.29; 80% 29.81.

mless Tubing: Copper 32.22; yellow brass 0; commercial bronze 90% 34.27; red s 85% 33.51; 80% 33.03.

e: Yellow brass 28.98; commercial bronze, 32.39; 90% 31.90; red brass, 85% 30.89; 30.41; best quality brass 29.87.

per Wire: Bare soft, f.o.b., eastern mills, 000 lb lots 23.30, l.c.l. 23.925, c.l. 23.425; therproof, f.o.b. eastern mills, 100,000 lb 25.35, l.c.l. 26.10, c.l. 25.60; magnet, ered, c.l. 28.50, 15,000 lb of more 28.75, 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	Round R317-T4, 17S-T4	Hexagonal R317-T4	Hexagonal 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $18.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $18.00 per cwt. Traps and bends: List price plus 48%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 111.00c, 500 to 999 lb, 111.50c; 200 to 499 lb. 112.00c; less than 2090 lb, 113.50c; ball, 1000 lb and over, 113.25c; 500 to 999 lb, 113.75c; 200 to 499 lb. 114.25c; less than 200 lb, 115.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 67.9c; 100 or 300 lb drums only, 100 to 500 lb, 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c; 10,000 lb and over, 54.4c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 96.00c; more than 2000 lb, 94.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 83.00c; 100 lb kegs 84.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; composition red brass 13.50; radiators 10.50; heavy yellow brass 10.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; refinery brass (60% copper) per dry copper content 13.25; radiators 10.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 13.50-13.75; No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.25-11.50; No. 1 composition turnings 10.75-11.00; mixed brass turnings 6.75-7.00; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.50-6.75; heavy yellow brass 7.75-8.00; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.75-9.00; cocks and faucets, 9.25-9.50; brass pipe 9.75-10.00.

Lead: Heavy 9.50-9.75, battery plates 5.00-5.25; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.75-10.00.

Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.

Tin: No. 1 pewter 48.00-50.00, block tin pipe 70.00-72.00, No. 1 babbitt 36.00-38.00.

Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

49	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
N. 10	18.50	12.55	10.00	94.50	17.00	32.00	40.00	73.25
N. 9	18.50	12.80	10.00	94.50	17.00	32.00	40.00	73.25
N. 7-8	18.50	12.80	9.75	94.50	17.00	32.00	40.00	73.25
N. 3-5	18.50	12.80	9.75	94.00	17.00	32.00	40.00	73.25
N. 1-2	17.625	12.80	9.75	94.00	17.00	32.00	40.00	73.25
Avg.	17.625	13.242	9.317	95.505	17.00	32.00	40.00	73.25
28-31	17.625	12.80	9.50	94.00	17.00	32.00	40.00	73.25
27	17.625	12.80	9.50	94.50	17.00	32.00	40.00	73.25
24-26	17.625	12.80	9.25	95.00	17.00	32.00	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del, New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Nov. 10, 1949; gross tons, except as r
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 10	$28.00
Oct. 27	28.00
Oct. 1949	26.71
Nov. 1948	43.25
Nov. 1944	16.40

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$29.00-30.00*
No. 2 Heavy Melt.	27.00-28.00*
No. 1 Busheling	29.00-30.00*
No. 1 Bundles	29.00-30.00*
No. 2 Bundles	24.00-25.00*
No. 2 Bundles	24.00-25.00
No. 3 Bundles	23.00-24.00
Heavy Turnings	23.50-24.50
Machine Shop Turnings	21.50-22.00†
Mixed Borings, Turnings	21.50-22.00†
Short Shovel Turnings	23.00-24.00
Cast Iron Borings	22.00*
Low Phos. Steel	31.50-32.50

* Nominal.

Cast Iron Grades*

No. 1 Cupola Cast	*37.00-38.00*
No. 1 Machinery Cast	**39.00-40.00**
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	**31.00**
Axles	**35.00-36.00**
Rails, Random Length	**34.00-35.00**
Rails, 2 ft and under	**38.00-39.00**
Rails, 18 in. and under	**39.00-40.00**
Railroad Specialties	**32.00-33.00**
Angles, Splice Bars	**32.00-33.00**

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$30.00-30.50*
No. 2 Heavy Melt. Steel	*30.00-30.50*
No. 1 Busheling	*30.00-30.50*
No. 1 Bundles	*30.00-30.50*
No. 2 Bundles	*23.50*
Machine Shop Turnings	*19.00*
Mixed Borings, Turnings	20.00†
Short Shovel Turnings	20.00†
Cast Iron Borings	20.00†
Bar Crops and Plate	*32.00-32.50*
Punchings & Plate Scrap	*32.00-32.50*
Cut Structurals	*32.00-32.50*

†Nominal.

Cast Iron Grades

No. 1 Cupola	*44.00-45.00*
Charging Box Cast	*37.00-38.00*
Stove Plate	*38.00-39.00*
Heavy Breakable Cast	*35.00-36.00*
Unstripped Motor Blocks	*32.50-33.50*
Brake Shoes	31.00-32.00
Clean Auto Cast	45.00-46.00
No. 1 Wheels	*39.00-40.00*
Burnt Cast	*33.00-34.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*33.00-34.00*
R.R. Malleable	*38.50-39.00*
Rails, 3 ft and under	*43.00-44.00*
Rails, Random Lengths	*38.00-39.00*
Cast Steel	*35.00-36.00*
Railroad Specialties	*35.00-36.00*
Uncut Tires	*35.00-36.00*
Angles, Splice Bars	*41.00-42.00*

VALLEY

No. 1 Heavy Melt. Steel	*$32.50-33.00*
No. 2 Heavy Melt. Steel	*30.50-31.00*
No. 1 Bundles	*32.50-33.00*
No. 2 Bundles	25.00-25.50
Machine Shop Turnings	*22.50-23.00*
Short Shovel Turnings	*24.50-25.00*
Cast Iron Borings	*23.50-24.00*
Low Phos.	31.00-31.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	*33.00-34.00*

PHILADELPHIA

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	*23.00-24.00*
No. 1 Busheling	*23.00-24.00*
No. 1 Bundles	25.00
No. 2 Bundles	*22.00-23.00*
Machine Shop Turnings	17.00
Short Shovel Turnings	18.00
Mixed Borings, Turnings	16.00
Bar Crop and Plate	*27.00-28.00*
Punchings & Plate Scrap	*27.00-28.00*
Cut Structurals	*26.00-27.00*
Elec. Furnace Bundles	25.00
Heavy Turnings	25.00
No. 1 Chemical Borings	*27.00-28.00*

Cast Iron Grades

No. 1 Cupola Cast	35.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	*35.00-36.00*
Heavy Breakable Cast	*35.00-36.00*
Unstripped Motor Blocks	30.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00
Malleable	*39.00*

CINCINNATI

No. 1 Heavy Melt. Steel	$27.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	27.00
No. 1 Bundles	27.00
No. 2 Bundles	22.00
Machine Shop Turnings	14.00
Short Shovel Turnings	17.00
Mixed Borings, Turnings	15.00
Cast Iron Borings	17.00

Cast Iron Grades

No. 1 Cupola Cast	**41.00**
Charging Box Cast	**31.00**
Heavy Breakable Cast	**34.00**
Stove Plate	**30.00**
Unstripped Motor Blocks	**20.00**
Brake Shoes	**22.00**
Clean Auto Cast	41.00
Drop Broken Cast	**45.00**

Railroad Scrap

No. 1 R.R. Heavy Melt.	29.00
R.R. Malleable	33.00
Rails, Rerolling	38.00
Rails, Random Lengths	35.00
Rails, 18 in. and under	44.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	*$21.00-22.00*
No. 1 Bundles	*24.00-25.00*
No. 2 Bundles	*20.00-21.00*
No. 1 Busheling	*24.00-25.00*
Machine Shop Turnings	*16.00-17.00*
Mixed Borings, Turnings	*16.00-17.00*
Short Shovel Turnings	*18.00-19.00*
Cast Iron Borings	*18.00-19.00*
Punchings & Plate Scrap	*24.00-25.00*

Cast Iron Grades

No. 1 Cupola Cast	*34.00-35.00*
Heavy Breakable Cast	*30.00-31.00*
Clean Auto Cast	*34.00-35.00*

BUFFALO

No. 1 Heavy Melt. Steel	*$28.00-28.50*
No. 2 Heavy Melt. Steel	*25.50-26.00*
No. 1 Bushelings	*25.50-26.00*
No. 1 Bundles	*26.50-27.00*
No. 2 Bundles	*24.00-24.50*
Machine Shop Turnings	*19.00-19.50*
Mixed Borings, Turnings	*20.00-20.50*
Cast Iron Borings	*20.00-20.50*
Short Shovelings	*21.50-22.00*
Low Phos.	*30.00-35.50*

Cast Iron Grades

No. 1 Machinery	37.50-38.00
No. 1 Cupola	36.50-37.00
Mixed Yard	35.50-36.00
Malleable	34.50-35.00

Railroad Scrap

Rails, 3 ft. and under	35.00-36.00
Scrap rails	30.00-31.00
Specialties	31.00-32.00
No. 1 car wheels	32.00-33.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$21.00-22.00*
No. 2 Heavy Melt. Steel	*19.00-20.00*
No. 1 Busheling	*19.00-20.00*
No. 1 Bundles	*21.00-22.00*
No. 2 Bundles	*18.00-19.00*
Machine Shop Turnings	*11.00-12.00*
Mixed Borings, Turnings	*11.00-12.00*
Short Shovel Turnings	*11.00-12.00*
Punchings & Plate Scrap	*23.00-24.00*
Cut Structurals	*23.00-24.00*
Elec. Furnace Bundles	*23.00-24.00*

Cast Iron Grades

No. 1 Cupola Cast	**29.00-30.00**
No. 1 Machinery	**31.00-32.00**
Charging Box Cast	**25.00-26.00**
Heavy Breakable	**25.00-26.00**
Unstripped Motor Blocks	**26.00**
Malleable	*36.00*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$20.00-20.50*
No. 2 Heavy Melt. Steel	16.50-17.00
No. 1 Bundles	*20.00-20.50*
No. 1 Busheling	*16.50-17.00*
Machine Shop Turnings	*11.50-12.00*
Mixed Borings, Turnings	10.00-10.50
Short Shovel Turnings	*13.50-14.00*
Bar Crops and Plate	*21.50-22.50*
Punchings & Plate Scrap	*21.50-22.50*
Chemical Borings	*19.00-19.50*

Cast Iron Grade

No. 1 Cupola Cast	30.00-31.00
Mixed Cast	27.00-28.00
Heavy Breakable Cast	28.00-29.00
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	$29.00-30.00
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	26.00-27.00
No. 3 Bundles	18.00-19.00
Machine Shop Turnings	21.00-22.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings	22.00-23.00
Cast Iron Borings	20.00-21.00
Bar Crops and Plate	29.00-31.00
Punchings	29.00-31.00
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	24.00-25.00
Cut Structurals	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	*42.00-43.00*
Clean Auto Cast	*42.00-43.00*
No. 1 Wheels	33.00-34.00
Stove Plate	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00
Malleable	37.00-38.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	42.00-44.00
Rails, 2 ft. and under	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Railroad Specialties	35.00-36.00
Angles, Splice Bars	36.00-37.00

* Nominal.

ST. LOUIS

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	25.00-26.00
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	21.00-22.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
Charging Box Cast	**34.00-35.00**
Heavy Breakable Cast	**32.00-33.00**
Brake Shoes	32.00-33.00
Clean Auto Cast	40.00-42.00
Burnt Cast	32.00-33.00

Railroad Scrap

R.R. Malleable	31.00-32.00
Rails, Rerolling	*40.00-42.00*
Rails, Random Lengths	*36.00-37.00*
Rails, 3 ft. and under	37.00-39.00
Uncut Tires	29.00-30.00
Angles, Splice Bars	37.00-38.00
Railroad Specialties	*33.00-34.00*

BIRMINGHAM

No. 1 Heavy Melt. Steel	**$25.00**
No. 2 Heavy Melt. Steel	**24.50**
No. 1 Busheling	
No. 2 Bundles	
Machine Shop Turnings	
Mixed Borings, Turnings	
Short Shovel Turnings	
Cast Iron Borings	
Bar Crops and Plate	
Cut Structurals	

Cast Iron Grades

No. 1 Cupola Cast	**34.00-**
Stove Plate	**28.00-**
No. 1 Wheels	**23.00-**

Railroad Scrap

No. 1 R.R. Heavy Melt.	
R. R. Malleable	**no**
Rails, Rerolling	
Rails 3 ft. and under	**25.00-**
Angles and Splice Bars	**31.00-**

SAN FRANCISCO

No. 1 Heavy Melt. Steel	**$**
No. 2 Heavy Melt. Steel	
Nos. 1 & 2 Bundles	

Cast Iron Grades

No. 1 Cupola Cast	**23.00-**

Railroad Scrap

No. 1 R.R. Heavy Melt.	
Wheels	
Rails, Random Lengths	

SEATTLE

No. 1 Heavy Melt. Steel	*$*
No. 2 Heavy Melt. Steel	
No. 1 Busheling	
Nos. 1 & 2 Bundles	
No. 3 Bundles	
Machine Shop Turnings	
Mixed Borings, Turnings	
Punchings & Plate Scrap	
Cut Structurals	
Elec. Furnace Bundles	

Cast Iron Grades

No. 1 Cupola Cast	**25.00-**
Heavy Breakable Cast	
Stove Plate	
Unstripped Motor Blocks	
Malleable	
Brake Shoes	
Clean Auto Cast	
No. 1 Wheels	

Railroad Scrap

No. 1 R.R. Heavy Melt.	
Railroad Malleable	
Rails, Random Lengths	
Angles and Splice Bars	

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	**$**
No. 2 Heavy Melt. Steel	
Nos. 1 & 2 Bundles	
No. 3 Bundles	
Machine Shop Turnings	
Mixed Borings, Turnings	
Punchings & Plate Scrap	
Electric Furnace Bundles	

Cast Iron Grades

No. 1 Cupola Cast	**$**

Railroad Scrap

No. 1 R.R. Heavy Melt.	
Rails, Rerolling	

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$
No. 1 Bundles	
Mechanical Bundles	
Mixed Steel Scrap	
Mixed Borings, Turnings	
Rails, Remelting	
Rails, Rerolling	
Busheling	
Bushelings new factory, prep'd	
Bushelings new factory, unprep'd	
Short Steel Turnings	

Cast Iron Grades*

Cast	40.00-

* Removed from price c
Aug. 9, 1947; quoted on bas
f.o.b. shipping point.

heets Strip . . .

heet and Strip Prices, Page 137 & 138 & 139

New York—Strong pressure for heets continues. With many pro-icers down because of the strike d with the coal supply critical, ill deliveries are extended and in-finite. Producers who are strike-ound are quoting tentatively around to 14 weeks on hot-rolled, from the me of resumption of operations, and to 16 weeks on cold-finished and ght galvanized sheets.

One leading eastern producer, now operation, is quoting 12 to 14 eeks on hot sheets and heavy gal-nized, with deliveries more extended cold and light galvanized.

Philadelphia—While deliveries are w being received by buyers from eet mills which have recently re-med operations, they are against d contracts and represent tonnage at was ready, or about ready, for ipment at the time the mills were rced down. On new orders de-eries range anywhere from 12 to weeks, assuming no further dis-ptions at the coal mines. One ller, not as yet in operation, has tle to offer before April on hot and ld sheets. Practically all sheet lls, even including those which have en able to run throughout the ike period, will go into next year th substantial arrearages.

Boston—Deliveries against some rike-bound hot strip tonnage and w rollings are bolstering supply th some cold-finishing mills; two ajor suppliers are in production d one lost no tonnage. Demand for ld strip is active with producers oked well into first quarter. While me purchasing has been of a pro-tive nature, bulk of forward ton-ge booked for both sheets and strip likely to stick in view of increasing lications steel prices will advance rly next year. For most part con-mers of flat-rolled have managed to intain operations, but in numerous tances full force of lost tonnage yet to be experienced.

Pittsburgh—Mills which resumed erations last week should be in sition to make partial shipments hin ten days; full operations will t be resumed before three weeks. lers intend to place all sheet and ip items on a strict allotment basis a least through first quarter. De-eries on galvanized and cold-rolled ets are booked four months ahead; meling stock, three months; hot-led and silicon sheets, slightly over months. There is no assurance duction schedules will be main-ned at practical capacity pace in-ated for late this year once inven-y pipe lines have been refilled. ne consumers indicate they may e to cancel orders on mill books, ed on probable reduction in de-nd for finished goods. Indicated ht supply situation in galvanized t other sheet items over coming nths is reflected in starting up of hand sheet mill facilities at Apol-Pa., and offers to pay $10 or more ton premium for specific tonnages these items. Nonintegrated cold-ed strip interests' inventories of -rolled material were practically leted before cessation of opera-ns.

4 BIG ADVANTAGES

Available Through SHOP CONTROL OF SURFACE ROUGHNESS!

Through control of surface roughness, your production departments can—

1 Reduce Sizing and Finishing Time

The procedure is simple: (1) Check the finish obtained from each step of the present series of operations. (2) Eliminate any operations that contribute little or nothing to final size and finish. (You may find *several* such operations.) (3) Check the remaining operations to determine what finish *at each step* gives desired *final* size and finish in lowest total time. (4) Specify those finishes, and maintain them.

2 Save on DIMENSIONAL Control

The dulling of tools and abrasives, which causes *dimensional* errors, first increases the normal point-to-point variations in *surface roughness* of the parts produced. By taking occasional roughness measurements on the parts at the machine, the inspector or operator detects the *start* of this increase in roughness variation, and knows that soon thereafter the work will be off-size. Thus tools can be sharpened or wheels dressed in time to prevent dimensional errors—yet no oftener than necessary.

3 Save Time in Setting Up for Duplication of Long and Short Runs

By making roughness measurements during set-up, the operator can quickly determine the effects of steps taken to obtain the required finish from each operation. Thus he can complete the set-up faster and with little or no scrap.

4 Improve Quality of Product

This is done by making sure that important surfaces are consistently finished to the roughness values required for best performance of the product.

These advantages, and others too, are being obtained in hundreds of plants by NUMERICALLY SPECIFYING the microinch roughness of machined, ground and finished surfaces—external and internal—and by CHECKING those surfaces with the Profilometer . . . quickly, accurately, in the shop.

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MONARCH

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Cleveland—Fabricators face ti supplies in flat-rolled steel produ at least through next April. T two local producers, Republic St Corp. and Jones & Laughlin St Corp., are getting back into prod tion following agreements with t union, but how long it will take t mills to regain pre-strike rolli schedules is uncertain.

The mills booked tonnage throu out the strike. As a result, hea order backlogs will be carried i first quarter.

Effect of the strike settlements flat-rolled steel prices is a mat for speculation among buyers. will be sometime before producers a sufficiently informed as to the imp of the welfare package on their co to determine definite price policy.

Cincinnati—Production of she will be resumed this week at Newpo Ky., mills of International Detr Corp. Steelmaking was begun l week in preparation for rolling. heavy carryover will force rationi effective on first quarter outp

St. Louis—Sheet demand cont ues to flow into this area from mote points. Generally it is refus since local mills' schedules are fil through March.

Chicago—Curtailment of operati can't be avoided by a large numl of sheet consumers because stoc have become too unbalanced. Sho age is most pronounced in light a medium gage sheets. Gray marl operations and conversion deals a most common in these. Convers ingots have been offered here at $ a ton. Off-grade material is in fa ly good demand as a stop-gap a leads on surplus stocks are quic followed up. Mills generally will tempt to get steel out without spec regard to customers' most pressi requirements. Some mill men ha advised users not to change ord already scheduled because of the c fusion which would result. So electrical sheet users have been a to lend material to less well stock manufacturers.

Los Angeles—Pressure from sh consumers for early places on n books is building up steadily. though virtually no fabricator h entirely exhausted his stocks, m are trying to replenish inventori Producers of flat-rolled items who mained in operation note a st tapering in first quarter bookings other mills resume. Cold-rolled sh and strip, galvanized, and light ga plate are expected to rem on semi-allocation basis for seve months, with some categories of p probably being allocated through t first quarter.

Semifinished Steel . .

Semifinished Prices, Page 137

Pittsburgh—Number of produc have been asked to help ease critical steel supply situation processing ingots in stock or th furnished by customers prior to time new steel is available. As no firm commitments have b made in this respect because of inability to accurately determine ti schedule of starting up rolling r operations in relation to availabil of raw steel.

teel Bars . . .

Bar Prices, Page 137

Pittsburgh—Demand is expected to ceed supply for both carbon and oy merchant and cold-finished bars least through January. Merchant rbon bar order backlogs are exded two months in the East and ee months in the West, although ring strike period most sellers de no firm delivery commitments. latively few consumers of carbon rs have as yet been forced to close nts because of depleted stocks. wever, many customers have had curtail production schedules, and some instances will be forced to se before mill shipments can be umed. Some cold finishers esite it will be nearly three weeks er mills resume operations before -rolled inventories will be adeately rebuilt to permit reopening plants. This situation, of course, l not apply to those cold finishers uck Oct. 1. Some cold finishers imate order backlogs will be more n doubled before operations are umed.

Boston—Some producers of hotled carbon bars are booked well first quarter, although part of ent covering has been protective h some question as to releases. d-finished carbon bars are in bet supply, notably with mills that e been down with well balanced entories now available. Only coldwn specialties are extended bed three to four weeks. Warehouse cks of cold-finished and alloy bars also in good shape.

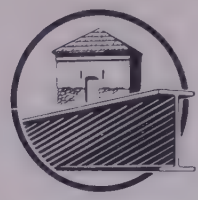
Philadelphia—Hot carbon bar conners are experiencing relief in the of supply as a result of various s now getting back into operation. e have received limited shipments in a few days after labor conet settlement, tonnage that was y for shipment before the strike an. Delivery promises on new rs, however, are rather extended.

New York—Hot carbon bar coners are encouraged over the out for supplies, with some mills ening.

everal leading mills are quoting nd two months from time of reption of operation on new orders small sizes; six to eight weeks for larger. They expect quite a little yover as well as delay in resuming onal operations. One mill which resumed operations is quoting weeks on an average.

old drawers find their inventories ming increasingly unbalanced; ertheless, most can still offer y nearby delivery on a number pecifications.

Chicago—Pressure on the mills h went back to work last week avy from cold-drawers, some of m have either been closed for of hot bars or are on greatly ced schedules. Cold-finished bar and is active, although some of stems from users needing the readily available substitute. Approximately the first month of rolling will take little cognizance of s' most pressing needs. Some rial on the immediate schedule is required for production purposes next February, but in the interof greatest output the schedules



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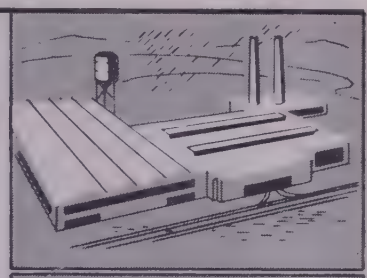

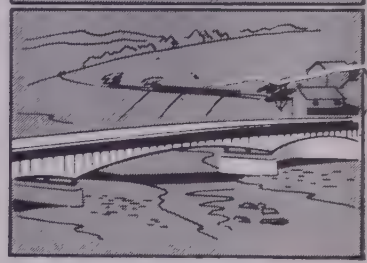

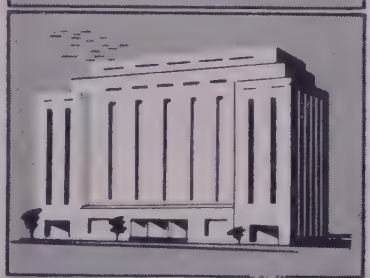

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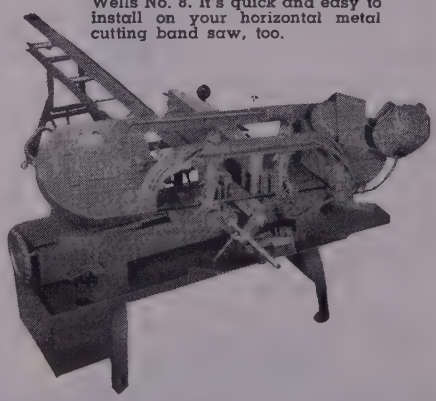

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will be adhered to strictly. This p
icy should make surplus offerin
more plentiful at the outset.

Cleveland—Relatively tight sup
situation is expected in carbon b
over the remainder of the year a
well into first quarter. The situat
will be less acute than in the fl
rolled products, however. Some
tioning may be necessary since
least two-months production
have been lost by the time the m
are back in full operation.

Los Angeles—As they resume o
put, bar mills are experiencing no
surge in production over prestr
levels. Consumers in this insta
apparently had above normal
stocks when the shutdown beg
lived off their fat, and are in no hu
now to rebuild inventories.

Plates . . .

Plate Prices, Page 137

Chicago—Business for major ta
fabricators in the area appears
be looking up. Bulk of demand is
units of 5000-gallon capacity a
larger, the household tank busin
having passed its seasonal peak. Pl
demand, like that for all other st
products, will be substantial at fi
but some producers do not exp
quotas to be required after the fi
rush. Requirements of some us
notably in the railroad equipm
field, are not expected to bolster
mand as they normally would.
this connection, it is evident that c
siderable refrigerator car ordering
in prospect and some other frei
car work as well. Southern Pacifi
reportedly inquiring for 5100 cars

Boston — Scattered shortages
plates with fabricating shops are
ing eliminated; mills resuming p
duction are shipping old tonnage a
promising delivery against new
ders in three to four weeks. Ur
operating during strikes are sligh
more extended, but most can s
take volume for shipment late t
quarter.

New York—Eastern plate mi
except one, are in operation. Luk
Steel Co., Coatesville, has adjus
its labor controversy and expects
be in full operation this week. Wo
Steel Co., Claymont, Del., has
sumed negotiations with the uni
Producers now operating can s
before end of this year since dem
tonnages.

Philadelphia—District plate p
duction is expected to be back to p
strike levels in the near future. Be
lehem Steel Co. units are now at
proximately normal operations, a
Lukens Steel Co., Coatesville, Pa.
stepping up output rapidly. It sta
ed melting last Wednesday and
the end of the week was scheduled
have nine open hearths going.

Cleveland—With the heavy ind
tries, such as the railroads, c
tinuing to restrict purchases,
tivity in the plate market in t
district is limited to small fil
tonnages.

Seattle—Plate shops have no c
standing contracts in hand, curr
operations involving small tonna
for tanks, irrigation pipe and sim
items. Inventories are low and r
material is not promised in less t
15 to 16 weeks.

n Plate . . .

Tin Plate Prices, Page 138

ittsburgh—Consumers' tin plate cks are fair. A few customers utilizing stocks for applications originally intended, but no curment in production schedules has urred. Time lag between resumpof ingot production and shipment in plate will be offset by processhot-rolled coils produced prior to strike and by release of tin plate nage held in warehouses. One e producer who has resumed opions had over 100 carloads of tin e on hand. Further processing of stock is not expected until conued flow of raw steel through inediate operations is assured. Tin e distribution likely will be under ct mill allotment through most of t quarter, perhaps longer, because substantial reduction in stocks and cipated continued high level conption.

ire . . .

Wire Prices, Page 139

leveland — Substantial backlog be carried into first quarter by wire mills as result of the steel ke. Noticeably tight supply situin in nails is reported in prost with orders extending into sec quarter with some producers. ivery dates are nominal, depend upon the speed with which the s get back into production. onger price tone is in evidence, talk of reductions having faded The Seneca Wire & Mfg. Co., toria, O., has advanced prices on and weaving wire from 7.70c to c, and on manufacturers bright, carbon wire from 4.50c to 4.65c, o. mill.

oston—While a price increase in e wire products is likely early year, little buying is predicated this possibility. Mills, including ialty producers, are booked well first quarter. Those halted by es will carry over into that od considerable volume that was ave been shipped during October November, notably items requirlonger processing in specialty ps. Among shortages, upholstery g wire is pronounced.

ittsburgh—Those wire producers resumed operations last week ect to start drawing operations in ten days, but won't achieve mill output for at least three ks. Little change in volume of ining orders was noted throughout strike period. Sellers' backlogs e from two to three months. Mill ments will be closely controlled chieve equitable distribution, algh most sellers do not plan to rn to a formal allotment policy. rods are expected to be in parlarly short supply because of the eted inventories among noninted wire producers, as well as nut bolt interests. Some wire manurers have been forced to limit r acceptances for rods because heir own requirements in the proion of finished wire products. Dead for fencing and barbed wire is expected to be improved over trike levels because of seasonal

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.050"— 63.00 Pounds — $30.40
.049"— 61.74 Pounds — $29.79
.048"— 60.48 Pounds — $29.18
.047"— 59.22 Pounds — $28.57

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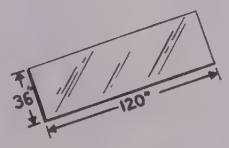

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factors. Jobbers' stocks of nails in popular size ranges are badly depleted, indicating unusually heavy demand for this product over coming month.

Structural Shapes . . .

Structural Shape Prices, Page 137

Philadelphia—Shape consumers are now receiving some shipments against old orders but find that on new contracts delivery promises range generally from six to eight weeks. This is especially true of wide flange sections. One large shape producer not yet in production is promising shipments against new orders in six to eight weeks from time of resumption.

Most structural shops believe they are over the hump insofar as steel stringency is involved. Actually they are more concerned at the moment about prospects for new business.

Boston—Standard structural shape tonnages are again reaching fabricating shops. Two producers are promising delivery within four to five weeks on new orders. Some tonnage on mill books when strikes started will not be available until late December or early next year; delivery on new orders is being promised after Jan. 1.

Pittsburgh—Mill order backlogs in plates and structurals, excluding wide flange beams, are less extended than in other products. Jones & Laughlin Steel Corp. is scheduling new orders for delivery within six weeks, inclu ing an estimated two weeks befo near capacity rolling schedules can resumed. Structural activity amo nonstruck concerns has held up fa ly well since Oct. 1. New bookin have been restricted generally those requiring standard specific tions.

Los Angeles—Structural demand holding steady, although supplies a more than adequate. After flatte ing out in recent months, constru tion in Los Angeles county bounc back during October to an all-ti high. Building permits totaled $2 million, an increase of 37 per ce over September, and 81 per cent ov October, 1948. A steel construct specializing in service stations f oil companies currently has t largest bookings in its history.

Seattle—Fabricators have a fa volume of small jobs of less than 1 tons each. Largest tonnage pendi is 1250 tons for the Chief Jose dam bridge, Washington. Shops ha sufficient inventory to carry them f 60 days but deliveries on the Paci Coast are not expected for 90 da after eastern mills resume operatio

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 137

Boston—Concrete reinforcing b stocks held by fabricators and d tributors are low and new orders a more difficult to place. Two leadi fabricators have been down since O 1 and the load carried by others h depleted inventories.

Seattle—Operations have been r sumed at Bethlehem's Seattle pla on a 50 per cent basis. Capacity expected within the next week. fair order backlog is reported, though prior to the shutdown deli eries were heavy. There is a fa demand for reinforcing materials small tonnages.

Pig Iron . . .

Pig Iron Prices, Page 136

Chicago — Although majority foundrymen have not suffered fro lack of pig iron, a substantial nu ber have had to bring it in from ou side the district to maintain oper tions. A Canadian furnace operat who previously had been actively s liciting business here, now is ove sold, according to local consume One complaint frequently voiced foundry operators is over differenc in chemical composition of iron the same freight car, an indicati that stored material is moving in consumers' hands. Officials of so large foundries are now specifyi greater use of iron in the melt, rel tively good availability of iron, hi scrap prices and natural preferen for a high iron-to-scrap ratio bei cited. Isolated foundries have b tered their operating levels in the la few weeks, but the number is t few to indicate a trend. Some o servers say a few malleable shops, seeking business, are pricing th product too low, some castings bei offered for as low as 6 cents a pour

Cleveland—No shortage of m

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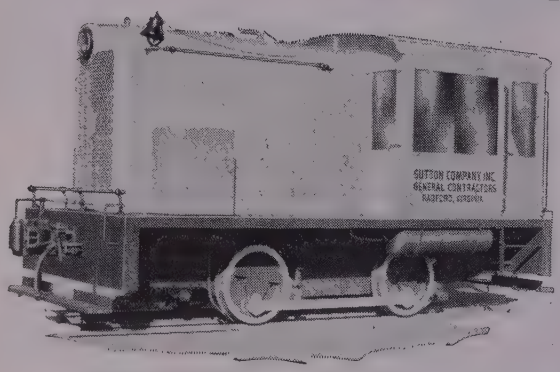

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ant pig iron threatens here with undries generally operating around per cent of capacity. Except for ke, raw material inventory posi- n of foundries is good. Conse- ently, casting shops are adding to ocks cautiously. With holdup or- rs still coming through, the in- ntory position of most foundries s lengthened. One large foundry ports some of its customers, evi- ntly anticipating early termination the strike, are stepping up their sting schedules. Shrinking coke ventories threaten further drastic rtailment of foundry operations thin two weeks. Even if the steel rike is settled by that time, resump- n of active merchant iron demand dependent on the availability of al. The increasing shortage of el may force further curtailment blast furnace operations and delay sumption of active production at acks of steel producers who have ttled with the union. Republic eel Corp. has only three weeks' pply of coal on hand.

Buffalo—Nine of the area's 15 ast furnaces were back in opera- n this week following the industry rike tieup. Bethlehem relighted five acks and Republic two here and e at Troy. American Radiator's nawanda unit resumed operations rlier. While seven of the active its were on basic iron, the resump- n of activity eliminated the possi- ity of an iron shortage at this time. any foundries also had pared op- ations as a result of the steel shut- wn.

New York—Most district foundries ve fair pig iron supplies but are ncerned over the coke outlook. By- oduct ovens are beginning to cur- l. For the present, most foundries e able to carry on with little or no duction in operations.

Considerable imported iron is of- red, but with few transactions. strian iron is available at $44.25, f.; Dutch iron of good standard ality is offered around the same el. Belgian iron is quoted around 8, c.i.f. Swedish charcoal iron, oted at $100, c.i.f. eastern seaboard, or to devaluation abroad, declined rtly thereafter to around $80 and now offered at $75. Little trading reported.

Philadelphia—Resumption of coal ning has cast a brighter hue on e outlook for pig iron and coke pply. Some furnaces that have en curtailing production are tem- rarily revising their plans. By- oduct coke oven operators also are ffening their schedules.

Cincinnati—Merchant pig iron con- ues to come into the district in ficient volume so that there may some piling. The situation in oven undry coke supply is becoming sperate among customers of pro- cers who face early curtailment ess they receive coal shipments mptly. Stove foundries have been sy, but jobbers' backlogs have been ered by cutbacks in castings needs ich were affected by lack of steel.

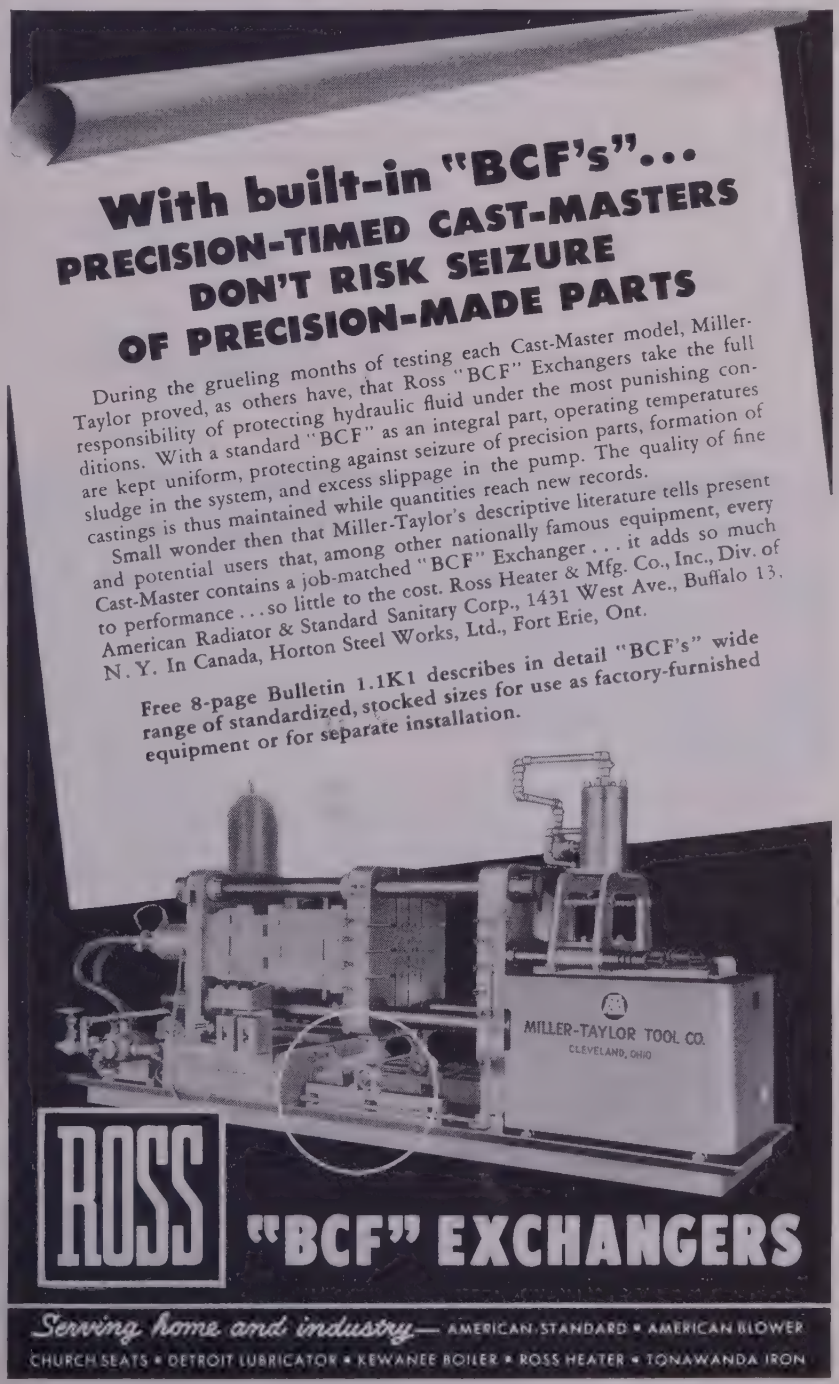
St. Louis—Ground stocks of pig in are dwindling rapidly as out- e demand mounts for metal. Kop- p's Co. at Granite City, Ill., has itated to blow in its second furnace while the coal outlook remains uncertain. Pickup in pig demand is not all attributable to the strike. There is some buying to replenish inventories which have been cut back too sharply by foundries.

Birmingham—Pig iron melters are pressed to keep abreast of demand. With Republic Steel's operations down, Sloss-Sheffield and Woodward are besieged for tonnage. Foundry operations are picking up.

Iron Ore . . .

Iron Ore Prices, Page 140

Cleveland—Only a comparatively few freighters will return to the ore trade this season, even if additional steel firms reach agreements with the union soon. Pittsburgh Steamship Co. has decided to berth for the winter its entire fleet of 61 carriers, having a trip capacity of 689,250 tons. Shipments of Lake Superior ore totaled 17,273 tons from United States upper lake ports and 55,261 tons from Canadian ports, making a total of 72,534 tons for the week ended Nov. 7 compared with 62,653 tons for the preceding week and 1,923,338 tons for the like week a year ago. Total shipments for the season to Nov. 7 amount to 68,348,390 tons compared with 76,992,816 tons for the like period a year ago.



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Scrap . . .

Scrap Prices, Page 144

Pittsburgh—Mills find it increa ingly difficult to purchase No. heavy melting steel at $29, reflectin growing conviction among deale and brokers of higher price leve in near future. Sale of No. 1 at Wa ren, O., at $33 coupled with pri advances in other districts suppo this view because this is a "minus scrap area. At present price leve in the East, No. 1 delivered he would range between $32 and $3 At start of strike, mill scrap i ventories were in good shape and i the interim some interests have bee able to augment stocks. Bright i got production outlook at least we into first quarter combined with sea sonal adverse effects on the colle tion and segregation of scrap a offsetting factors. Railroad scra quotations remain nominal at well b low prices paid by brokers for d livery to mills outside this distric Little activity noted among ca grades, although representative to nage of No. 1 cupola has been so within range of $37-$38, up $1.

Brokers were reportedly paying $ for No. 1 heavy melting, $30 for No. and $28 for No. 2 bundles. No sal were confirmed, however, up to la last week at these levels.

New York—Steel scrap demand stepping up, especially from the Pitt burgh area. Some brokers decla there is more business available tha they are willing to accept until ma ket undergoes further clarificatio They have advanced buying pric on No. 1 heavy melting steel and N 1 bundles to $21-$22, f.o.b. shippin point; No. 2 heavy melting and No. busheling to $19-$20; No. 2 bundl to $18-$19. They have advanced o ferings on machine shop turning mixed borings and turnings and sho shovel turnings to $11-$12; on punch ings and plate scrap, cut structura and electric furnace bundles to $2 $24. Cast grades generally are stron but unchanged, except for malleabl which is now $36.

Philadelphia—A strong underton continues in scrap. While No. heavy melting is unchanged at $2 No. 2 heavy melting and No. 1 bus eling are stronger at $23-$24 and N 2 bundles at $22-$23. Bar crop an plate and punchings and plate scra are higher at $27-$28; cut structural $26-$27; No. 1 chemical borings, $27 $28. Charging box and heavy break able cast have been increased to spread of $35-$36, delivered. Ma leable is stronger at $39.

The leading eastern consumer c steel scrap has issued releases agains orders placed prior to the strike,

Boston—No. 1 heavy melting ste is $1.50 higher with demand slightl more active. No. 1 bundles have als advanced with the top grade of heav melting, but No. 2 is inclined to la Offers of $11.50, shipping point, fo turning result in slight interest. Cas grades are slow with prices un changed for the most part.

Buffalo—Fresh strength is appa ent in the scrap market despite ab sence of new business. Prices o steelmaking grades regained the $ nominal loss registered during strik

Cleveland—Undertone of the scrap arket strengthened further last eek as suppliers prepared to handle rge orders from mills resuming op- ations. Prices advanced on the sis of sales to mills outside this strict.

Consumption of scrap is expect- to be heavy for at least four onths, covering a period when move- ent of material is hampered by ad- rse weather conditions. At present, pply of industrial scrap has been duced by the curtailment in metal- orking shops, the flow of scrap this onth being 60 to 70 per cent below at in October. Supply of railroad aterial has been cut sharply since eration of work trains was banned a coal conservation measure.

Detroit—Spurred on by exception- ly strong dealer sentiment, scrap s moved up for the third consec- ive week, all steel grades advanc- g $2 a ton and cast iron $1. Brokers e having difficulty buying at the gher levels. Some dealers, for ex- nple, are asking $30 a ton for No. bundles, against a published price $25. McLouth Steel Corp. started electric furnaces at Trenton, ich., last week, after being down nce spring. Rotary Electric Steel , is operating all its electrics, both mpanies presumably having sub- ntial orders for conversion ingots m automotive companies. Conver- n business is being booked on a -day basis, so there will be a scram- e for scrap tonnage among elec- c furnace plants for that length time.

Great Lakes Steel Corp.'s open arths will resume shortly. The mpany's scrap position is com- table at the moment in view large tonnage laid down dur- g the strike for its account. How- er, peak operations cannot be sup- rted without further buying.

Large yard accumulations of scrap ve been shipped out of this district water for Cleveland and Buffalo, there is little material hanging er the local market.

Plant scrap will be off sharply for e next two months due to cutbacks automotive schedules. This, plus e normal decline in peddler collec- ns during the winter, lends addi- nal bullishness to the market.

Chicago—Traders are more cau- us and prices for the moment are bilized by a mill purchase of No. eavy melting at $30, No. 2 heavy lting at $28 and No. 2 bundles at 6. Brokers' offerings in some cases re about $1 less than these figures, hough railroad material continues command a substantial premium. recognition of the present market, me dealers have upped buying ces for most grades $1-$2 and are orted by generators as eager to gment their yard stocks. Good ndry scrap is in fairly active de- nd, although price is working ainst too strong a demand. Cu- a cast has been sold for as high $44, but a representative level is ween $1 and $2 less. Some out- district mills have relaxed their ht rejection policies on bundles, w admitting some material con- ning galvanized.

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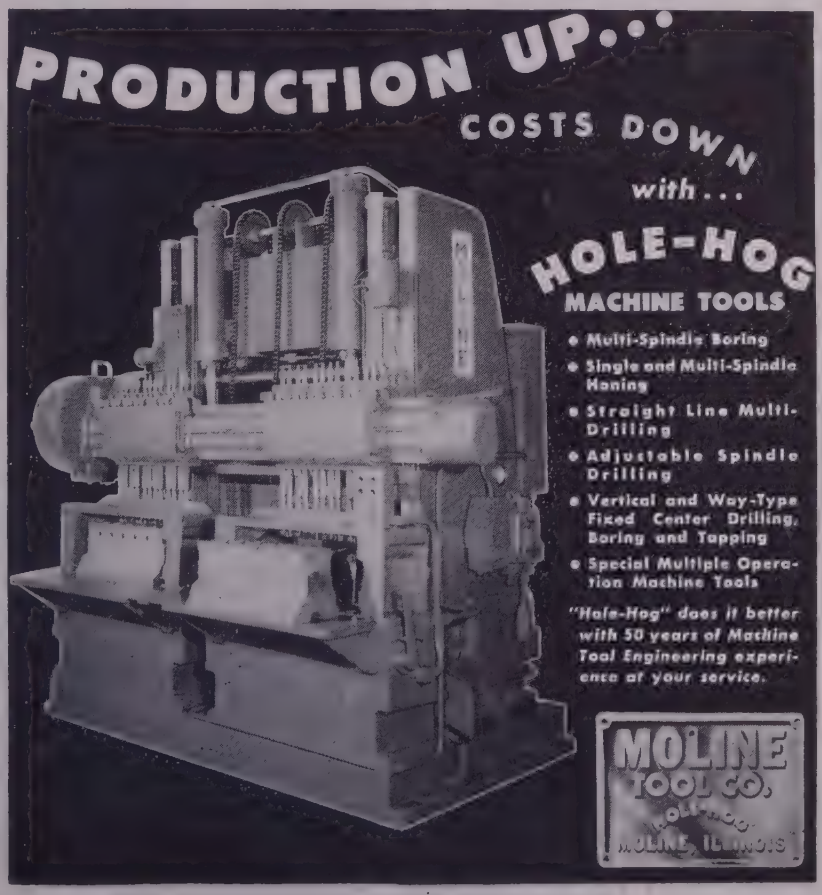

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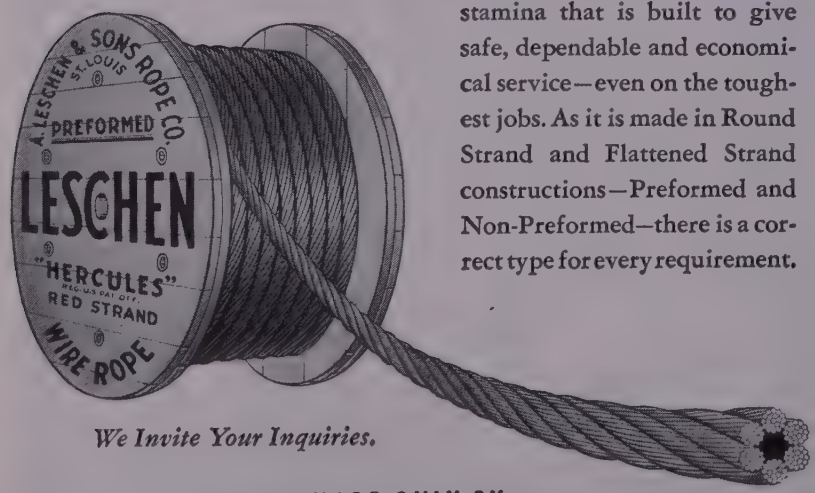

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Cincinnati—Scrap prices rema unchanged, with some dealers hol ing tonnage in anticipation of an a tive market as soon as strikes a settled. Some new buying has be done by a district interest just r suming operations.

St. Louis—Scrap shipments conti ue heavy on filling of old orde There is practically no new buyi locally. Although still short of f winter needs, mills are holding off watch the post-strike price trer Cast demand is tapering. Railro scrap was bid up $1 to $3 last we on a 43-car offering by Missouri P cific, its first sale of consequen since its 26-day strike shutdown.

Birmingham—Considerable stoc ing of scrap is being done, althou the movement has been slowed colder weather and a lessening truck activities. Heavy melting co tinues at $25. Some tonnage h moved to the Gadsden plant of R public Steel Corp., but buying h not been particularly heavy.

Los Angeles—Demand for ste making scrap is picking up, althou not yet on the scale some observe had expected. Mill inventories ge erally are in good shape, and the specifying will be moderate for t time being. Suppliers of at least o major strike-bound plant have quie ly been stock piling scrap to meet i future requirements. Demand f cupola cast and electric furnace bu dles is slow, with foundries operatin at an average of 30 to 35 per ce of capacity.

Seattle — With the reopening Bethlehem's Seattle plant, steel scra prices advanced $2 to basis of $18 f No. 1 and 2 heavy melting. Amp tonnages are reported available f current needs. Inventories are lo Foundries' operations are declinin Cast iron scrap is $25 to $27.50 a to

Metallurgical Coke . .

Metallurgical Coke Prices, Page 140

Pittsburgh—Resumption of co mining operations on a full week bas until Nov. 30 will result in reinsta ing beehive oven operations her Many of these interests shut dow soon after coal miners instituted day per work week schedules. Foun ry coke has been in critical short su ply for weeks, the only offsettin factor being sharp curtailment i foundry operations due to lack of o ders because of the steel strik Some emergency shipments of foun ry coke have been sent here fro the East and Pittsburgh Coke Chemical has been able to also hel ease the supply situation.

Chicago—Most sellers and co sumers concede that coke quality ha suffered as the result of stringenc in coal. Operators of Indiana an Illinois coal fields, seriously concerne over the inroads made on the domes tic market by other fuels, are seek ing lower freight rates to this di trict in an effort to gain industri users. Before the coal strike's su pension, it became necessary for lea ing sellers to chop allocations shar ly, consumers reporting 60 to 100 p cent cuts. Better supply of coal expected to result in at least parti restoration of previous quotas.

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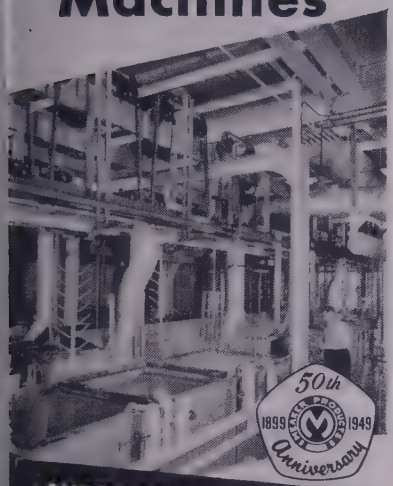

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Refractories . . .

Refractories Prices, Page 140

Pittsburgh—Sharp reduction in refractory brick output immediately following the start of the steel strike Oct. 1 has been partially reinstated with production emphasis on silica and basic brick for anticipated heavy demand resulting from widespread damage to open-hearth roofs. Shortage of coal is a deterring factor in this connection. Shipment of coke oven brick was not interrupted throughout the strike period. Deliveries of standard refractory items are readily available from stock, while specialty grades can be obtained within the normal production cycle.

Warehouse . . .

Warehouse Prices, Page 141

Boston—Buying from warehouses has slackened. Inventories of sheets are low and out of balance. With return to lower level of volume, distributors are more concerned in plugging holes in inventories on most products rather than large overall replacement. Buying from mills is heaviest in flat-rolled items.

Philadelphia—Jobbers, who had an unusually active business in October, say that on a daily basis they would have almost as good a volume of orders this month were it not for the fact their stocks are too unbalanced.

Pittsburgh—Most distributors estimate it will be three to four weeks before mills, which resumed operations last week, will make shipments in volume. Distributors have reduced substantially stocks of slow-moving items and have depleted stocks of sheets, wide flange beams and other items in heavy demand.

Cleveland — The strike-run on warehouse stocks of sheets and strip has been so heavy jobbers' inventories in these products are pretty close to bottom. In the case of some distributors, stocks have just about disappeared. Demand for bars also has been heavy. Distributors have moved substantial tonnages of ordinarily slow-moving items during the period of the strike.

Cincinnati—Abnormal demand because of mill shutdowns has drained district warehouses of sheets, plates and structurals. Jobbers have fair tonnage of bars, but stocks are unbalanced.

Los Angeles—Despite gradual resumption of mill production, jobber activity remains good. However, warehouse stocks are low in cold-rolled sheet and strip, galvanized, some carbon bar items, and reinforcing bars. In most instances, inventories will not be back to prestrike levels until well into January. Scattered price-cutting early in September, followed by general warehouse reductions, have drastically lowered jobbers' profit margin. Some off-the-cuff increases, however, have taken place on individual deals during the shutdown on items which were in urgent demand.

Seattle—Jobbers' business volume, especially in bars and structurals, increased noticeably in the last ten

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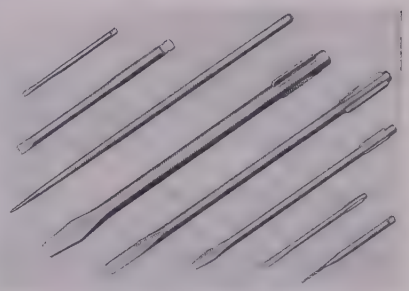

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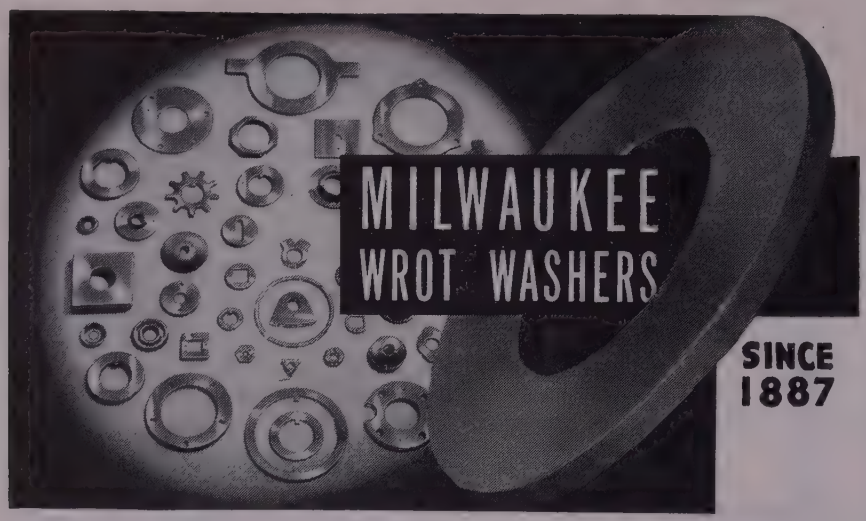

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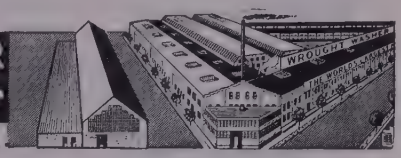

days of October rounding out a isfactory month. Warehouses h hot-rolled sheets in stock, but vanized are not obtainable.

Rails, Cars . . .

New York—Domestic freight awards continue light, although tober bookings increased to 201 u from 123 in September, rep American Railway Car Institute. bookings last month were pla with commercial car builders.

Deliveries in October dropped ther to 4532 from 6141 in Septem Of last month's deliveries, 2828 w from commercial car builders 1704 from railroad shops. Lead types of delivered were 1883 hop 843 box, 465 flat, 317 tank, 145 frigerator cars and 873 gondolas.

Backlogs as of Nov. 1 totaled 17, against 22,203 Oct. 1 and 111,40 year ago. Backlogs at the beginn of this month involved 7594 cars commercial shops; 9783 at railr shops.

New York—Contracts totaling million for 226 diesel-electric loco tives have been awarded by the Pe sylvania Railroad. This is the la est single award of diesel loco tives ever made by this compa Six companies share in the busin American Locomotive Co., New Yo Electro-Motive Division, General tors Corp., LaGrange, Ill.; Fairba Morse & Co., Chicago; General E tric Co., Schenectady, N. Y.; Lima-Hamilton Corp., Lima, O. der consists of 176 yard switchers road freight units, and 5 road pass ger locomotives.

STRUCTURAL SHAPES . . .

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1500 tons, Department of the Navy, plain terial, various deliveries, to Bethlehem Co., Bethlehem, Pa.

660 tons, Watsonville Pajaro river bridge state of California, to San Jose Steel Inc., San Jose, Calif.

650 tons, bridges and spans, contract N Olneyville cutoff, Providence, R. I. American Bridge Co., Pittsburgh; M Gammino Construction Co., Provid general contractor.

600 tons, foundry, Budd Co., Philadelphi Bethlehem Steel Co.

200 tons, Elliot street bridge, Boston, w design, to West End Iron Works, Bo Monroe & Langstroth Co., North Attle Mass., general contractor.

160 tons, St. Mary Queen of Heaven paro school, Avenue M and 57th street, Broo N. Y., to Grand Iron Works Inc., York.

150 tons, state bridge, Monroe county, sylvania, to Bethlehem Steel Co.

120 tons, plant additions for Seidelhuber & Bronze Works, Seattle, and Pacific N west Ford Tractor Co., Tacoma, Wash Leckenby Structural Steel Co., Seattle.

110 tons, laboratory expansion, Her Powder Co., Hercules, Del., to Belmont Works, Eddystone, Pa.

100 tons, airplane repair shop, Ladd Alaska, to Leckenby Structural Steel Seattle; Gaasland Construction Co., ge contractor.

STRUCTURAL STEEL PENDING

2800 tons, veterans hospital, Philadelphia; Dec. 6.

1250 tons, Chief Joseph dam, Washin bids in Nov. 9 to U. S. Engineer, Seat

800 tons, various reclamation projects in W ington and Idaho; bid calls to be issued November by Bureau of Reclamation, ver.

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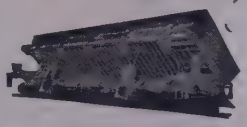

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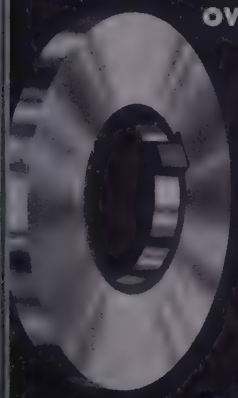

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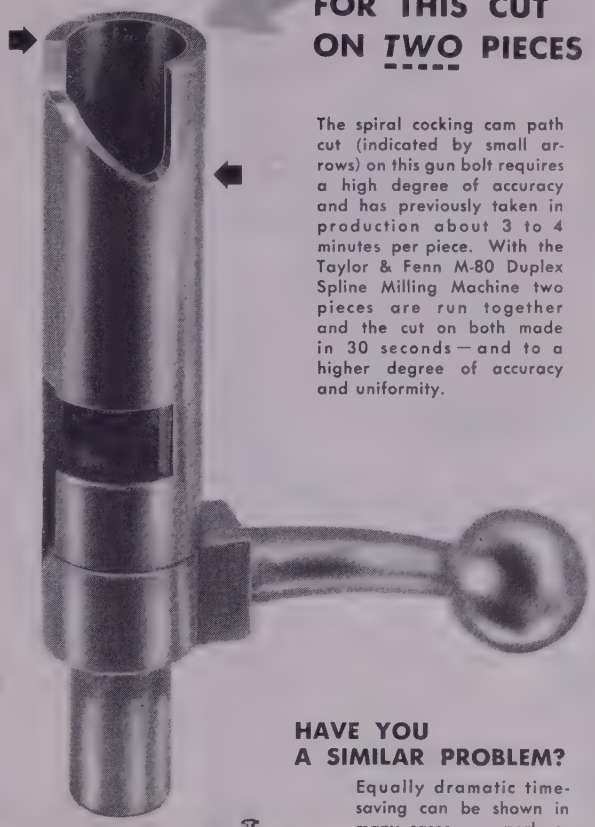

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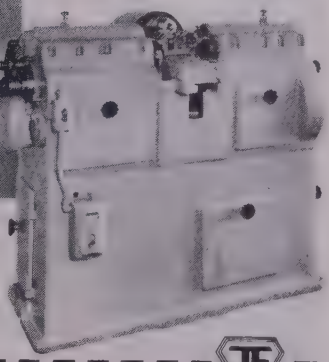

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600 tons, plant, A. H. Karagheusien, Freehold, N. J.; pending.

600 tons, research laboratory, Sharpe & Dohne, West Point, Pa.; bids Nov. 21.

510 tons, state bridges, Shelton, Conn.; bids Nov. 21 and 28, Hartford.

490 tons, Harrisburg hospital, Harrisburg, Pa.; H. B. Alexander, that city, awarded general contract.

490 tons, west extension state turnpike, section 31-G, Westmoreland county, Pennsylvania; bids Nov. 15.

430 tons, two-span through truss bridge, Lancaster, N. H.

360 tons, state bridge, Attleboro, Mass.; Westcott Construction Co., Attleboro, low on general contract.

300 tons, state bridge, section I, LR38-005, Lebanon county, Pennsylvania; bids Dec. 2.

200 tons, alterations, Philadelphia-Camden bridge; bids to be closed by Delaware River Bridge Commission, Philadelphia, Nov. 28.

150 tons, Navy communications center, Puget Sound, Wash.; bids Dec. 9.

125 tons, Bell Telephone exchange, Haddenfield, N. J.; Irwin & Leighton, Philadelphia, awarded general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

265 tons, Elliot street bridge, Boston, to Northern Steel Co., Boston; Monroe & Langstroth Co., North Attleboro, Mass., general contractor.

250 tons, Watsonville Pajaro river bridge, by state of California, to San Jose Steel Co. Inc., San Jose, Calif.

210 tons, veterans' hospital, Holyoke, Mass., to Truscon Steel Co., Boston; M. Slotnick Co., Boston, general contractor.

200 tons, Maple Vista apartments, Olympia, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

170 tons, Martinique apartments, Milwaukee; to U. S. Steel Supply Co., Chicago.

160 tons, three public schools, Missoula, Mont., to Northwest Steel Rolling Mills Inc., Seattle.

100 tons, A. E. Staley Mfg. Co., Decatur, Ill.; to U. S. Steel Supply Co., Chicago.

70 tons, addition, Bethlehem's Seattle plant, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1600 tons, various reclamation projects in Washington and Idaho; bid calls to be issued late November by Bureau of Reclamation, Denver.

1030 tons, Parkway Garden homes, Chicago; bids asked.

700 tons, housing project, Cambridge, Mass.; C. J. Maney Co., Boston, low on general contract.

350 tons, Mt. Savage school, Mt. Savage, Md.; bids asked.

240 tons, high school, Arlington Heights, Ill.; bids asked.

190 tons, Wheeling & Lake Erie RR bridge, Cleveland; bids asked.

187 tons, bridge, St. Croix, Wis.; bids asked.

PIPE . . .

STEEL PIPE PENDING

Unstated, 2477 feet, 4 in. and accessories; bids to H. O. Hult, secretary, LID No. 3, Alderwood Manor, Wash., Nov. 14.

Unstated, 7500 feet 6 and 8 in. and accessories; Consolidated Supply Co., Spokane, Wash., apparently low to Walla Walla, Wash., $11,991.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Illinois Terminal, nine 1000-hp diesel-electric engines, to American Locomotive Co., New York.

RAILS PLACED

St. Louis-San Francisco, 27,500 tons of 115 and 132-pound rail, to Tennessee Coal, Iron & Railroad Co., Birmingham.

CONSTRUCTION AND ENTERPRISE

IDAHO

COEUR D'ALENE, IDAHO—Montana Pul Paper Co., W. F. Emory, Polson, Mont., nounces purchase of 180 acres on which planned to erect a $1.5 million pulp plan

LEWISTON, IDAHO—Potlatch Forests Inc engaged in preliminary engineering surv planning construction of a $12 million and paper plant near here.

ILLINOIS

BELVIDERE, ILL.—Midwest Bottle Cap has awarded the contract for a 1-story b and concrete block factory building, to tain about 15,000 sq ft of floor space, to Glass Construction Co. It will cost wards of $68,000 with equipment.

LIBERTYVILLE, ILL.—Frank G. Hough East Sunnyside avenue, has awarded general contract for construction of a tory addition to Campbell Lowrie Lau milch, 400 W. Madison St., Chicago, $130,000. E. O. Sessions Engineering 1 N. LaSalle St., Chicago, engineer.

MINNESOTA

DULUTH—National Iron Co., West Duluth checking damages, roughly estimated several thousands of dollars, following a which damaged a three-story wareho located at the rear of the iron works used to house old patterns used in manufacture of iron and steel products.

MISSOURI

POPLAR BLUFF, MO. — Missouri-Arka Power Corp. broke ground for power p and distribution system, cost $2.9 millio

ST. LOUIS COUNTY, MO.—Union Electric 315 N. 12th St., plans power genera plant, confluence of Mississippi river Meramec river, cost $26 million.

NEW YORK

NIAGARA FALLS, N. Y.—Hooker Elec chemical Co. has been granted a buil permit to erect a new research building, timated cost $85,000.

NIAGARA FALLS, N. Y.—E. I. du Pont Nemours & Co. Inc. has been grante building permit to erect a new rese laboratory on the grounds of its local p at an estimated cost of $50,000.

OHIO

CLEVELAND—Parma Sheet Metal Inc., a cently incorporated firm, is setting u sheet metal shop in the Harvard-Den area.

CLEVELAND—Floyd C. Knight, 1832 Ta Rd., will start a machine tool factory 9615 Meech Ave. soon. Mr. Knight bo the land and plant owned by Cleveland public Tool Co. for $57,000 at a pu auction.

CLEVELAND — Hygrade Metal Fabrica Inc. has been incorporated to fabri metal, iron and steel products. Stephe Liptak of Hygrade Design Service, 4060 78th St., is secretary of the new firm John J. Dolezal Sr. will also be an office

MADISON, O.—Perfection Malleable Co. been incorporated by I. D. Jacobson Perfection Pipe Nipple Co., Lake stree NYCRR. The company will manufac and deal in plumbing supplies, etc. Na as incorporators are John D. Drinko, San FitzSimmons and Wm. R. Conelly.

RAVENNA, O.—Richard Dole Sheet M Shop, 222 W. Lake St., has been in porated by Richard Dole, Nedra De Yo and Simon De Young under the name Richard Dole Sheet Metal Shop Inc.

YOUNGSTOWN—Trimedge Inc. is erectin new building at its Mahoning avenue p to replace one damaged in a $1 million several years ago.

YOUNGSTOWN — Mahoning Paint Corp

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ATERING TO THE NEEDS of very customer—large or small—as been the guiding principle at & K ever since 1883. Your order ay call for one sheet of special erforations . . . or it may be or several thousand in a standrd pattern. Regardless of its ize, H & K treats every order ith equal attention, well knowng that proof of real success lies the long and continued satisaction of H & K customers.

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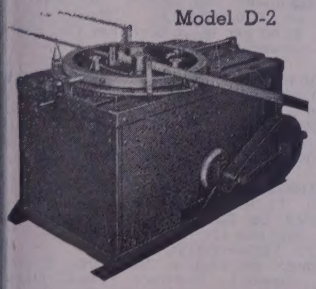
KARDONG FOUR-WAY BENDER

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal bender. With this bender when bending large bars it is not necessary to turn bars over to make reverse or second bends or 180 degree hook bends. The Model D-2 is equipped to bend bars around collars from 2 inch to 6 inch in diameter. Also made to bend up to 8 inch in diameter. Capacity of Model D-2 1¼ inch Square Bars. The Model D-2 is a production bender for concrete reinforcing steel for shop or fabricating plant. Ask for our catalog of our complete line of reinforcing bar benders.

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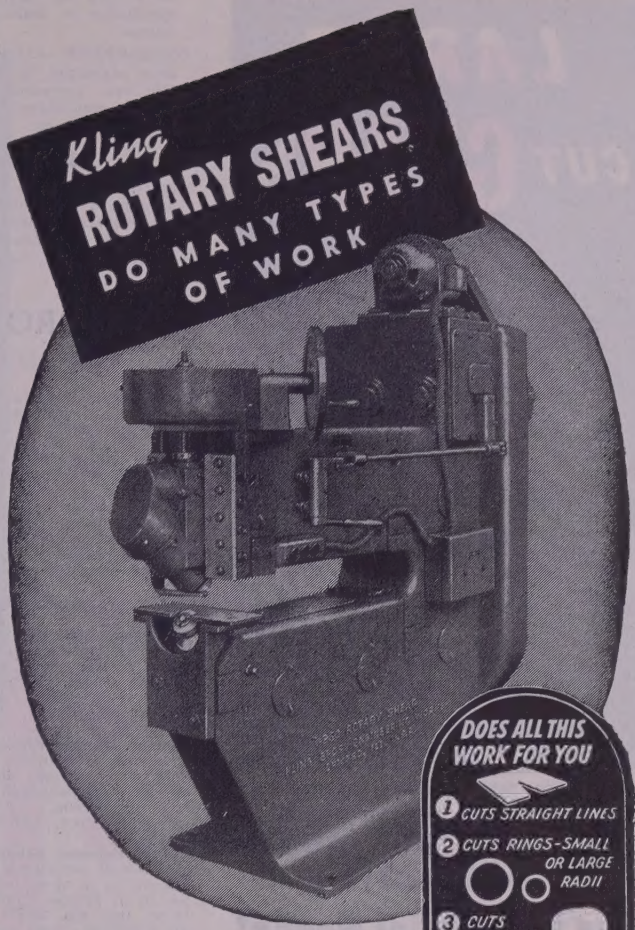

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For exacting projects (see illustration at the right), no single unit of metal-working equipment does so many different things so cleanly and efficiently as does the Kling Rotary, pictured above.

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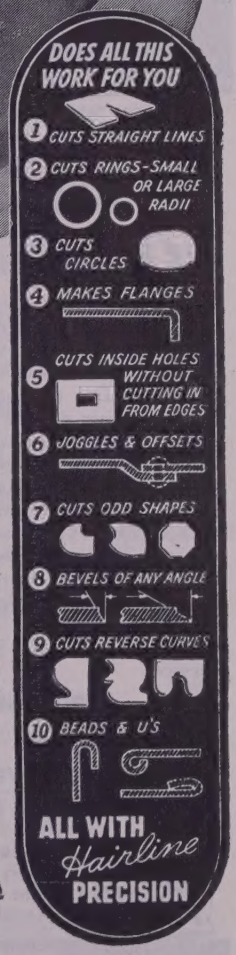

Send Today for Bulletin No. 245
which will give you specific facts, and specifications. No obligation involved. Users of heavy equipment of Kling Rotary Shears' class will receive a copy of this Bulletin promptly, on request.

KLING BROS. *Engineering Works*
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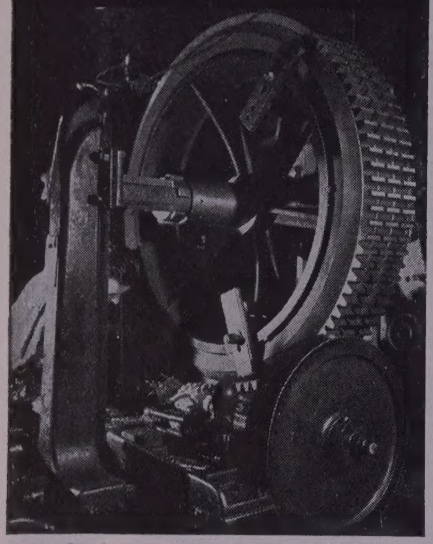
LARGE CUT GEARS



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completing an expansion to its plant which specializes in making industrial and home paints.

YOUNGSTOWN—Kinray Industries Inc. has been organized by Samuel Gluck, 113 Oak Hill Ave., Lawrence Gluck and Aaron Grossman to manufacture and deal in all kinds of metals, tools, etc.

PENNSYLVANIA

MEADVILLE, PA. — Construction will begin soon on a new tank car maintenance plant for General American Transportation Co. The firm has purchased a 55 acre plot in Sagertown, Md., for the new plant.

FERROALLOYS

(Concluded from Page 141)

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0 1% max.), $3. **Primos and High Speed Gra** (Va 35-55%, Si 1.50% max., C 0.20% ma $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lo $1.20 per lb of contained V_2O_5, freight lowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 W or more, $2.25 per lb of contained 2000 lb W to 10,000 lb W, $2.35; less th 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contr or spot, 1000 lb or more, $2.90 per lb of c tained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 43%, Fe 40-45%, C 0.20% max.). Contra c.l., lump, bulk 6.6c per lb of alloy, c.l. pack 7.35c, ton lot 8.1c, less ton 8.95c. Deliver Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 52%, Fe 8-12%, C 0.50% max.). Contra carload, lump, packed 20.25c per lb of all ton lot 21c, less ton 22.25c. Freight allov Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% ma Al 0.50% max., C 0.50% max.). Contra 100 lb or more, 1" x D, $1.20 per lb of loy. Less than 100 lb $1.30. Delivered. Sp add 5c. F.o.b. Washington, Pa., prices lb and over are as follows: Grade A (14% B) 75c per pound; Grade B (14-18% $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 lb contained B, f.o.b. Philo, O., with frei not to exceed railroad freight allowed to d tination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton carload, 8c per lb, f.o.b. Suspension Brid N. Y., freight allowed same as high-carl ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% ma Si 8% max., C 0.5% max.). Contract, ton l 2" x D, $2.90 per lb of contained Cb, less $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6 Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0. 1.25%, C 3.50-5%). Carload, 12 M x D, c load packed 19.0c per lb of material, ton 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6- Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carl packed. 1" x D, 43c per lb of alloy, lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7 Fe 20% approx.). Contract, carload, pack ½" x 12 M, 16.5c per lb of alloy, ton l 17.50c, less ton 18.5c. Delivered. Spot, a 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 11%). C.l. packed, 17.00c per lb of alloy; lots 18.00c; less ton lots 19.50c, f.o.b. Niag Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19 Mn 8-11%). C.l. packed, 14.25c per lb alloy; ton lots 15.75c; less ton lots 17.0 f.o.b., Niagara Falls, N. Y.; freight allov to St. Louis.

Simanal: (Approx. 20% each Si, Mn, A Lump, bulk, carload 11.00c. Ton lots, b 11.50c, packed 11.75c. Less ton lots, pac 12.25c per lb of alloy, f.o.b. Philo, O., w freight not to exceed railroad freight allov to destination.

Ferrophosphorus (23-25% based on 24% P c tent with unitage of $3 for each 1% of above or below the base); Gross tons per c load, f.o.b. seller's works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, c tained Mo, f.o.b. Langeloth and Washingt Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contai Mo., f.o.b. Langeloth and Washington, P packed in bags containing 20 lb of mol denum, 95.00c.

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Compact, inexpensive, Reliance Spring Lock Washers act as hardened thrust bearings . . . make possible tighter assemblies. Made of cold drawn spring steel, their powerful coil-spring tension compensates for wear and bolt stretch . . . keeps bolted assemblies tighter longer.

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cut costs

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Behind the Scenes...

Self Analysis

In the mail this week you may have received a questionnaire letter from our editors asking for your opinions and suggestions on some of our editorial features. Just as you are interested in your customers' reactions to your products, we too like to know what things you like the most or the least about STEEL each week. Do you, for instance, actually use the Contents page and select certain articles for close reading or are you a skimmer, who leafs through the issue page for page, stopping when something strikes your fancy or interest? Do you regularly read Mirrors of Motordom, Windows of Washington and The Business Trend? What, in your opinion, is the most interesting and helpful feature in STEEL? And how do you like the exclusive new Price Tables in the market section? If you weren't in on the particular group of letters that went out this week, we'd surely like to have you take a few minutes and give us your own comments, criticisms and suggestions in the form of a letter. It will be confidential but very much appreciated by all twenty-seven of our hard working editors who are doing everything they can to bring you the kind of service that is most helpful and interesting to you and the rest of your organization.

Top Rung

While we're on the subject of questionnaires, you may be interested in the fact that practically every one of the readership studies that have been conducted in the past year or more have shown STEEL magazine right up on the top perch among management, production, purchasing and engineering officials throughout the metalworking industry. It is a real gratification to see that kind of evidence reflecting the job we're doing and you can dig down deep and bet your last pesos that you'll find your favorite magazine in an even more comfortable position as the preferred metalworking publication as we go on into 1950.

McKinney on Shrdlu

From Albany, N. Y. comes an interesting letter from Laurence McKinney, president of James McKinney & Son, structural steel workers. Says Mr. McK: *"I don't know how old you are but I have seen you mentioned in print for some decades since you are spelled out in full along the bottom, I believe, of a linotype machine.*

"As a matter of fact, I, myself, was a Shrdlu three years ago when the Albany Artists' Group put on a fancy dress ball with the costume idea being 'Buccaneers'. I went as 'Shrdlu', a literary pirate, carrying a pen in place of a sword and passing out quotations from well-known authors, but all signed with my name. My wife went as 'Etaoin', a galley slave and wore a rather alluring costume made largely of galley proofs.

"May I say that yours is the one page I read in STEEL. *I am glad it is not at the end of the book or I would have to read the rest of the magazine".*

That costume idea is swell, Mr. McK., and the next time we're to take in a similar affair we're going to steal your stuff if we can get the little woman to hold still for an outfit of smudgy galley proofs. The only thing that bothers us is that last paragraph. When the hard working editors read it they're probably going to form a posse and hunt us out wherever we manage to hide.

Puzzle Corner

Several good readers came up with the correct answer on the turkey problem in time to get under the wire, including B. F. McNamee, National Technical Laboratories, Altadena, California and D. A. Cotton, Anderson, Indiana. Apparently everyone actually went to sleep on that train last week, however, because no one has yet crashed through with the solution which is 20 5/11 seconds according to our good friend, Bill Johnson.

Our other turkey problem was rushing the season just a little, but this one should be right in time for Thanksgiving. The owner of a small tool and die shop, having 12 employees, wishes to give a Thanksgiving turkey to all but one troublemaker. But he does not want the trouble-maker to know he is being discriminated against, as that might cause trouble with the union (as you know). So he arranges the men in a circle and says, "Every ninth man gets a turkey, and as soon as a man gets a turkey he drops out of the circle". Where did he place the trouble-maker in order to keep him turkeyless?

Shrdlu

(Editorial Index—page 45)

STEEL

Bol. 125—No. 21 November 21, 19

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